# DRIVERS OF ENVIRONMENTAL MANAGEMENT IN THE SANDF
# A CASE STUDY OF WESTERN CAPE UNITS 2011–2015

by

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**DECLARATION**

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

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## LIST OF ACRONYMS

| | |
|---|---|
| AEAP | Annual Environmental Awards Programme |
| AFB | Air Force Base |
| AWMU | Award-Winning Military Units |
| BEMs | Base Environmental Managers |
| CCMS | Committee on the Challenges of Modern Society |
| CEPS | Corporate Environmental Policy Statement |
| DEAT | Department of Environmental Affairs and Tourism |
| DoD | Department of Defence |
| EAP | Environmental Awards Programme |
| ECA | Environment Conservation Act |
| EEA | European Environment Agency |
| EEM | Effective Environmental Management |
| EIP | Environmental Implementation Plans |
| EM | Environmental Management |
| EMI | Environmental Management Inspectorate |
| EMS | Environmental Management System |
| ERF | Environmental Review Forum |
| ES | Environmental Services |
| GIS | Geographic Information Systems |
| IEM | Integrated Environmental Management |
| LBW | Langebaanweg |
| MEM | Military Environmental Management |
| MG | Military Geography |
| MIEMP | Military Integrated Environmental Management Plan |
| MLRA | Marine Living Resource Act |
| NATO | North Atlantic Treaty Organisation |
| NEMA | National Environmental Management Act |
| NEMBA | National Environmental Management: Biodiversity Act |
| NEMPAA | National Environmental Management: Protected Areas Act |
| NEPA | National Environmental Policy Act |
| NFA | National Forest Act |

| | |
|---|---|
| NWA | National Water Act |
| RFIMs | Regional Facility Interface Managers |
| RSA | Republic of South Africa |
| SA | South Africa |
| SA Army | South African Army |
| SA DoDMV | South African Department of Defence and Military Veterans |
| SAAF | South African Air Force |
| SADF | South African Defence Force |
| SAM | South African Military |
| SAMA | South African Military Academy |
| SAMHS | South Africa Military Health Services |
| SAN | South African Navy |
| SANAD | South African Naval Armament Depot |
| SANDF | South African National Defence Force |
| SAS | South African Ship |
| SASO | Stability and Support Operation |
| SEWing | Strategic Environmental Working Group |
| SIPRI | Stockholm International Peace Research Institute |
| SMA | Saldanha Military Academy |
| SU | Stellenbosch University |
| UNEP | United Nations Environment Programme |
| USA | United States of America |
| WCR | Western Cape Region |

## DEFINITIONS OF TERMS

*SA DoDMV* refers collectively to the Secretariat of Defence and the Chief of the South African National Defence Force with the Chiefs of Corporate Divisions and their respective staffs.

*South African National Defence Force* refers collectively to the Chief of the South African National Defence Force with the Chiefs of Services and Corporate Divisions and their respective staffs.

*Environment* is described as the "surroundings within which humans exist and that are made up of:

(i) the land, water and atmosphere of the earth

(ii) microorganisms, plant and animal life

(iii) any part of (i) and (ii) and the interrelationship among and between them

(iv) the physical, chemical, aesthetic and cultural properties and conditions of the preceding that influence human health and wellbeing" (South Africa 2008:8).

*Environmental implementation plan* (EIP) refers to the documents that describe the "manner in which organs of state with actions that may adversely affect the environment will ensure that the policies, plans and programmes of a department will comply with the NEMA principles and national environmental norms and standards" (South Africa 2008:22).

*Environmental management* means the "management of the natural environment, including the interaction between plants, animals, humans, their actions (military activities) and other elements in their natural environment" (South Africa 2008:4).

*Effective environmental management* refers to the management of the environment in a way that "provides the most benefit or causes the least damage to the environment as a whole at a cost acceptable to society in the long term as well as in the short term" (South Africa 2008:8).

*Drivers of effective environmental management* refers to any factors that directly or indirectly contribute to effective environmental management (Kruger & Araujo 2015).

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## ABSTRACT

The primary function of the South African Department of Defence and Military Veterans (SA DoDMV) is to defend and protect the Republic of South Africa (RSA), its territorial integrity and its people in accordance with the Constitution and the principles of international law regulating the use of force. The South African National Defence Force (SANDF) has military units throughout the country. These units are situated in locations such that they contribute to the primary function of the SA DoDMV. To execute its undertaking, the SANDF requires resources such as land to conduct its activities. Military activities cause physical disturbance to ecosystems. These activities include military training, exercises, peace support operations and the actual conduct of war. Any and all of these activities may have a negative impact on the environment.

The Constitution of the Republic of South Africa (Act No. 108 of 1996), Defence Review 1996, 1998 and 2015, White Paper on Defence 1996 and the National Environmental Management Act No. 107 of 1998 (NEMA) mandate responsible environmental management (EM) from all organs of the state. In light of this policy framework, the SA DoDMV has established a broad strategy and several functional strategies for environmental services (ES) in the SANDF. Furthermore, the SANDF has for environmental management (EM) purposes grouped military units into five regions (Western Cape; Eastern Cape and KwaZulu Natal; Free State and Northern Cape; Limpopo; Gauteng and North West). The DoDMV published two editions of environmental implementation plans (EIPs), in 2001 and 2008 respectively. The primary aim of the first edition EIP was to represent an instrument for the promotion of co-operative governance around environmental management. The second followed on the efforts and commitments made in the First Edition EIP, as well as filling in any gaps that were identified.

As part of mechanisms for monitoring EM, the SANDF has institutionalised the Environmental Awards Programme (EAP). Military units in the Western Cape Region (WCR) have won more environmental awards than the other four regions in the country combined. The question, therefore, is which drivers are promoting effective environmental management (EEM) in award-winning military units (AWMU) in the WCR. The research statement was that there are drivers in the AWMU in the WCR that promote EEM.

The study adopted a qualitative research approach. Desktop study and semi-structured interview methods were employed to collect data. Purposive sampling was used to identify respondents.

The desktop study revealed the mechanisms that the SA DoDMV planned to use to address EM issues. Semi-structured interviews were used to investigate the drivers that environmental managers viewed as enabling the EEM. The collected data was analysed using content and thematic analysis. The results indicate that environmental managers view continuous environmental training, employee capacitation, the involvement of employees, external interaction, management support, and commitment as drivers enabling effective EM in the WCR.

The findings suggest that it is not just the presence of policies that prompt improved environmental performance, but internal factors too. The outcomes are noteworthy because they indicate what works in AWMU. Other units may use the findings to develop best practices to enhance their own environmental management performance.

**Keywords:** Environmental Awards Programme, effective environmental management drivers, Western Cape Region, military units, effective environmental management, environmental implementation plans.

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Lundi Ncubukezi

# CHAPTER 1: INTRODUCTION

Chapter 1 explains the reason for investigating drivers of effective environmental management (EEM) in selected units in the Western Cape Region (WCR). It commences with a background explanation of rise of environmental concerns, and the military impact on the environment and military EM. The rationale of the study, the research question, research statement, research aim and objectives follow the background to the study. Additionally, Chapter 1 also presents the limitations and assumptions of the study. The focus then shifts to a brief overview of the methodology, a schematic representation of the research design and a description of the outline of the thesis.

## 1.1 BACKGROUND TO THE STUDY

This section provides a short explanation of the rise of environmental concerns, the subsequent responses of various institutions and the military impact on the environment. A brief discussion of the introduction of military environmental management (MEM) concludes the section.

### 1.1.1 The rise of environmental concerns and military impact on the environment

On an international level, the book *Silent Spring* by Rachel Carson (1962) played a key role in expanding environmental awareness (Luther 2005). It led to the promulgation of environmental legislation at every level of government since the early 1970s (Luther 2005; Nogueiro & Ramos 2014). Thus, by the spring of 1970, the first Earth Day was celebrated (Rome 2003). Rome (2003) states that from the 1970s onwards, a variety of environmental laws were enacted. Sowman, Fuggle & Preston (1995) highlight that since then, environmental issues have been experiencing a gradual shift from being treated on an *ad hoc* basis to integration into all activities. Currently, governments, industries and citizens around the globe increasingly recognise the need to manage environmental issues (Lindsay & Morgan 1998). Military forces, as part of the government sector, are expected to perform their activities within the boundaries of national and international environmental legislation (Lindsay & Morgan 1998). Responsibility to look after the environment emanates from the fact that militaries control and are responsible for vast areas of land in their respective countries (Linkov & Ramadan 2004). For example, the United Kingdom Ministry of Defence holds approximately 1.2% of the country's surface area and also leases a large training area in Canada. The United States military controls 1.1% of the country's land, while the French military controls roughly 0.4% of the country's surface (South Africa 1998a).

The South African Department of Defence and Military Veterans (SA DoDMV) controls approximately 4200 square kilometres of land in South Africa (South Africa 2014). Due to the vast amount of land controlled by militaries, and the potential impact of their diverse activities, integration of environmental management practices into all military activities is essential. Hence, Diecidue (2008) recommends that the environment should be treated as an element of military doctrine. Militaries generally use the land allocated to them for field training, weapon testing, for research purposes, and to construct fixed assets such as buildings, roads and runways (South Africa 1996b; 2014). Lindsay & Morgan (1998) report that there is evidence that military activities such as weapon testing and military training, among other activities, have the potential to harm the environment. Thus, military environmental management is essential for modern day defence forces to minimise their adverse impact on the environment (Smit 2009).

### 1.1.2 Military environmental management

As early as the 1970s, militaries commenced drafting environmental policies and laws governing environmental practices to promote EM within their respective physical territories (Ramos & De Melo 2005). Following these developments the militaries adopted an environmental management system structure with the aim of assisting with military environmental management. Literature reveal that the militaries were optimistic about the outcomes from environmental management system (Ramos & De Melo 2005). However in South Africa it was in 1977 when the global growing environmental concerns resulted in the first environmental instruction, which compelled the then South Africa Defence Force (SADF), now the South African National Defence Force (SANDF), to look after the environment in which areas under their control are situated (Smit 2011; 2017).

This instruction paved the way for the first ever South African Defence Policy on environmental issues in 1978 (Godschalk 1998). In 1989 the Environment Conservation Act (ECA) (Act No. 73 of 1989) was promulgated (Godschalk 1998), providing for the determination of environmental policy to guide decision-making (Sowman, Fuggle & Preston 1995). In the same year, South Africa (SA) adopted the concept of integrated environmental management (IEM) (South Africa 1992). The adoption of IEM emphasised the incorporation of EM into all activities of the SA DoDMV (South Africa 1992). The IEM approach was strengthened by the introduction of the National Environmental Management Act (NEMA) (Act No. 107 of 1998), which became the framework for environmental legislation for South Africa (Magagula 2014).

NEMA required all state organs engaging in actions that have negative impact on the environment to compile environmental implementation plans (South Africa 1998b). SA DoDMV therefore also had to abide by NEMA (Godschalk 1998).

In response to the dictates of the instructions of the NEMA, the SANDF published two Environmental Implementation Plans (EIPs), in 2001 and 2008 respectively (South Africa 2001; 2008). An EIP is a four-year plan that acts as an instrument for the advancement of co-operative governance in EM (South Africa 2001; 2008; Smit 2009). The fundamental purpose of the EIPs is to ensure the protection of the environment (South Africa 2001). Military units of the SANDF are grouped into five regions (South Africa 2008). These regions are Western Cape, Eastern Cape, Free State, Gauteng and Limpopo. In each region, there is a regional office that co-ordinates environmental issues amongst the military units. The SA DoDMV has established mechanisms to monitor the implementation of EM and environmental performance. These mechanisms include the Environmental Review Forum (ERF), the Regional Environmental Advisory Forum (REAF), the Annual Environmental Management Report (AEMR), Auditing of military units, the Annual Environmental Awards Programme (AEAP), Communication and Ad hoc relations, as well as a guide to environmental compliance for Officer Commanding. The AEAP is discussed next, while the other mechanisms are discussed in detail in sections 2.3.4 and 6.2 respectively.

The AEAP covers ecological management, base environmental management, environmental education and awareness training, water efficiency, energy efficiency, integrated EM systems, and integrated waste management. In addition to being a monitoring mechanism, the AEAP aims to encourage military units to conduct sound EM (South Africa 2001; 2008). The adjudicators for the environmental awards include representatives from various government departments, NGOs and institutions of higher learning (South Africa 2001; 2008). Between 2011 and 2015, the military units in the WCR won more environmental awards than all other regions combined. However, no empirical research has been conducted to investigate the drivers of EM in award-winning military units (AWMU) in the WCR. This research aims to address this gap.

## 1.2 RATIONALE OF THE STUDY

The programmes of the SA DoDMV all have some effect on the environment. These programmes are providing forces, supporting forces and employing forces in an operational capacity (South Africa 2001; 2008).

The three programmes enjoy high priority when it comes to the core function of the SA DoDMV. The extent of environmental impacts associated with these programmes is amplified by the fact that they are repetitive by nature and are mostly confined to the geographical boundaries that constitute military training areas, military bases and military depots. (South Africa 2001; 2008).

Effective military environmental management is therefore vital for minimising the environmental impact of military activities and for direct support of the military mission (Godschalk 1996a; Waleij 2014). Defence authorities recognise that EM is relevant for keeping military land sustainable in the long term (Ramos & De Melo 2005). Consequently, the SA DoDMV is externally mandated by the Constitution and the NEMA to manage its land sustainably. It has, in turn, committed itself through the Defence Review, EIPs and Corporate Environmental Policy Statement (CEPS), and the developed and piloted Environmental Management System (EMS) to sustainable land management. Despite these actions, there is empirical evidence that environmental policies have limited capacity to control operations inside organisations and may be disconnected from the implementation of EEM practices (Crilley, Weber & Taplin 2012). Magagula (2014) reported that the SANDF faces challenges that undermine EEM such as limited knowledge. Limited knowledge about drivers of EEM may compromise or threaten the obligation of the SANDF towards its commitment and continual improvement. The identification and analysis of drivers of EEM may assist the SANDF in focusing its environmental effort and limited resources on drivers that are proven to enhance EM best practice.

## 1.3 RESEARCH STATEMENT AND RESEARCH QUESTION

The research statement for this thesis asserts that there are prevailing drivers in award-winning military units in the Western Cape Region that promote effective environmental management. This study seeks to answer the research question : What are the drivers of EM in award-winning military units in the Western Cape Region?

## 1.4 RESEARCH AIM AND OBJECTIVES

This study aimed to identify the drivers of EM on military lands in the WCR. The following objectives were pursued to achieve this aim:

(i) To identify military units in the WCR that has won at least one of the annual military environmental awards in the five years preceding 2016.

(ii) To analyse South African Environmental Implementation Plans with the aim of identifying mechanisms used by the SANDF in dealing with military environmental issues.

(iii) To develop a semi-structured interview schedule to identify drivers of EM in AWMU.

(iv) To conduct interviews with base environmental managers in award-winning military units and with regional facility interface managers.

(v) To isolate the most effective environmental management drivers in the Western Cape Region.

## 1.5 SIGNIFICANCE OF THE STUDY

This research identified the drivers of effective environmental management in AWMU in the WCR and provides reasons why the identified drivers are effective. The identified drivers can assist the SANDF in focusing its environmental effort and limited resources on developing proven EEM drivers. Furthermore, this research may also create the conditions that are essential for improving environmental performance within a military context. Lastly, this study profiled successful environmental managers and regional facility interface managers within military units in the WCR. There is limited literature on drivers of effective environmental management in the SANDF in particular, and why these drivers work. Thus, this research can contribute to knowledge creation in this area.

## 1.6 DELINEATION OF THE RESEARCH

The SANDF consists of four organisational and functional arms of service – the South African Army (SA Army), South African Navy (SAN), South African Air Force (SAAF) and South Africa Military Health Services (SAMHS) – which are spread throughout the country. All arms of service and their respective units are obligated to comply with environmental policies (South Africa 2001; 2008). However, this research was conducted only among the 2011 to 2015 environmental award-winning military units in the Western Cape, even though the unit of analysis selected in this study consisted of Base Environmental Managers (BEMs) and the two Regional Facility Interface Managers (RFIMs).

These military units are Air Force Base (AFB) Ysterplaat, AFB Langebaanweg (LBW), South African Ship (SAS) Saldanha, South African Naval Armament Depot (SANAD), Oudtshoorn Infantry School and AFB Overberg. There are a number of reasons for selecting only those military units in the WCR:

(i) The military units in the WCR consist of units representative of all arms of service.

(ii) SA Army, SAN and SAAF units from WCR have all won environmental awards over the period 2011 to 2015.

(iii) In addition, the WCR had won more environmental awards than all other regions in the country over the period 2011 to 2015.

(iv) Empirical evidence already exists in the body of knowledge (Magagula 2014) about SANDF units that have not won environmental awards.

(v) Moreover, no study has been conducted in the SANDF that focuses on studying drivers that contribute to an improved environmental performance from award-winning military units in a regional or national context.

(vi) The researcher is situated in the Western Cape, and it was possible to access the unit of analysis, taking into consideration the resources and time required and available to conduct the research.

The interview schedule questions were based on environmental implementation plans for Defence: Chapter 1 (Policies, plans and programmes); Chapter 3 (Co-operative governance), Chapters 4 and 5 (Mechanisms to implement environmental management). The participants in this study had to be appointed environmental managers functioning in a military unit that had won an environmental award over the period 2011 to 2015.

## 1.7 METHODOLOGY AND METHODS

This study used qualitative research methodologies to collect data guided by the aim of the research. First, the researcher collected secondary data through a desktop study. The desktop study aimed at gathering from literature an in-depth understanding of environmental management and environmental implementation plans of the SA DoDMV. Second, a semi-structured interview schedule was designed and piloted. After the piloting, it was used to collect information from participants in the study. The researcher divided the semi-structured interview schedule into the following sections: policies, plans and programmes, co-operative governance and partnership, monitoring mechanisms, general EM perceptions, capacity gaps and limitations, and overall drivers.

The semi-structured interviews aimed at understanding the drivers of EM from the perceptions of the BEM. The researcher recorded the semi-structured interviews and took notes during the interview sessions. Chapter 3 discusses in detail the methodological framework and the methods used in this study.

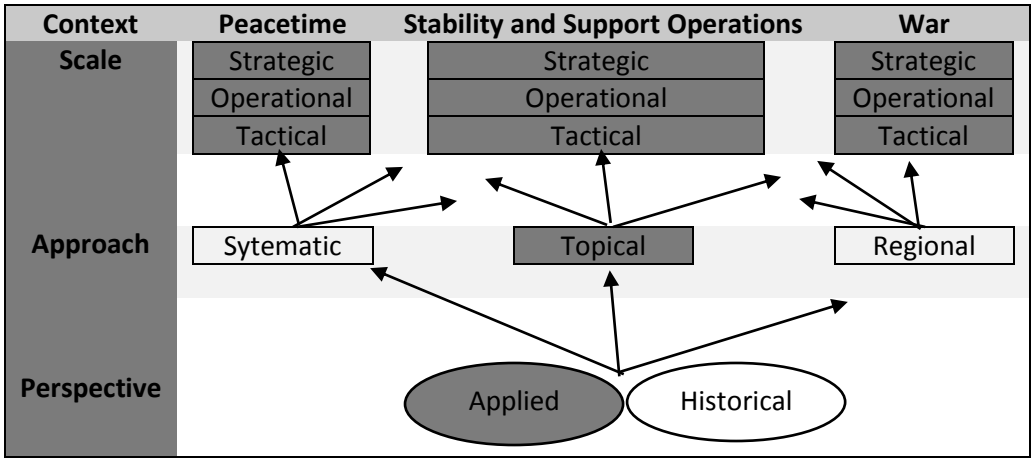
Ethical clearance was obtained from the ethics screening committee of the South African Military Academy (SAMA) and the Research Ethics Committee (Humanioria) of Stellenbosch University (SU). These committees found that the study does not impact adversely on any individual participant or institution, and would not compromise sensitive or security-related organisational matters. All the participants signed informed consent forms, and they participated voluntarily in the research after being assured that participation was optional. Participants also understood that they could withdraw at any stage. The data gathered was kept confidential and anonymous. The process of obtaining authorisation for the study within the SANDF started with the drafting of a letter to solicit permission to conduct the interviews in the AWMU in the WCR. This letter was submitted to the RFIM, and written authority to carry on with the study was obtained.

## 1.8 THE SCOPE OF MILITARY GEOGRAPHY AND MILITARY ENVIRONMENTAL GEOGRAPHY

Geographers concern themselves with understanding the components and processes of terrain, weather, climate, place, region and people (Palka & Galgano 2000; 2011). Geography is a broad subject, and as a result, is divided into two main branches: Human Geography and Physical Geography (Cloke, Crang & Goodwin 2004; Castree, Demeritt & Liverman 2009).

Human geography is a study of interaction between human beings and their environment in particular places and across spatial areas (Gregory et al. 2009). Physical geography is a branch of geography concerned with natural features and phenomena of the earth's surface, such as landforms, drainage features, climates, soils and vegetation (Pidwirny 2014). Military Geography (MG), as a sub-discipline of geography, forms a connection between geography and military science (Jackman 1962; Palka 2011a). Jacobs, Janse van Rensburg & Smit (2002) further state that MG is the use of a geographic approach to understand human–environment interaction and its impact on military planning and activities. Consequently, military geographers can apply knowledge, methods, techniques and concepts of geography to military affairs, places and regions (Jackman 1962; Galgano 2011; Smit 2017).

Palka and Galgano (2005: v) define MG as the "application of geographic information, tools and techniques for military problems". Military activities such as operations take place in distinct environments, for example, jungles, deserts, oceans and cities (Palka 2011b). These operations can occur in different operational contexts such as peacekeeping, disaster relief, civic action and conventional and non-conventional combat operations. Any of these operations are (at least in part) shaped by the nature of the natural environment and human landscape (Galgano & Palka 2011). Figure 1.1 depicts the scope of MG and illustrates that studies in MG can be approached from two perspectives – applied or historical – with an emphasis on the impact of physical or human geographic conditions on the outcomes of battles, campaigns or wars. The current study used the applied perspective. While the approach of such a study can either be systematic, topical or regional, a topical approach was adopted here. The magnitude or the scale of military operations can range from tactical through operational to strategic. These scales, in turn, may occur within the context of peacetime, stability and support operations, or war. This study was conducted at all three scales, with results applicable to all three contexts.

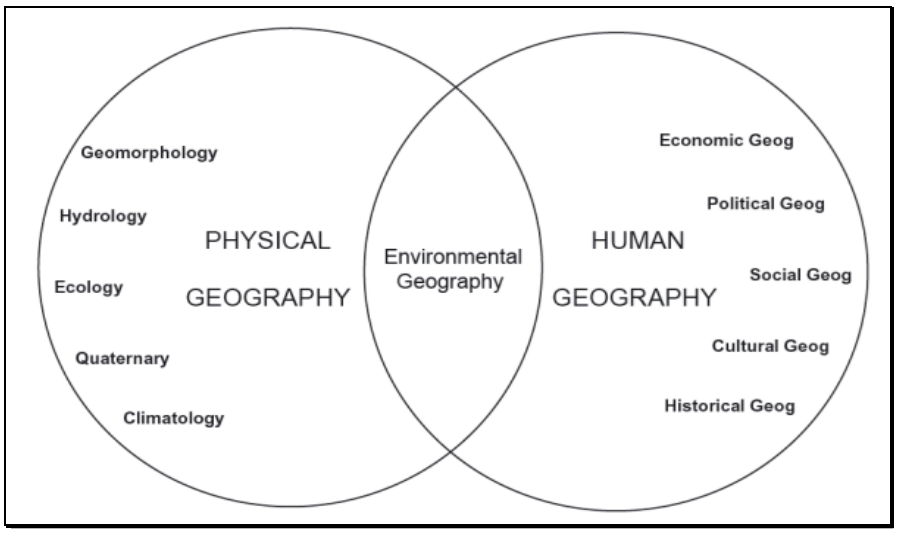



Source: Adapted from Palka & Galgano (2005: vii)

Figure 1.1: The scope of Military Geography

The main area of geography that studies the connection between physical and human geography is known as environmental geography (Whatmore 2002). Thus, a military geographer concerned with the connection between physical and human geography is dealing with military environmental geography. It is important to note that the mid-20$^{th}$ century (1940s to early 1960s), a period known as the quantitative revolution (Barnard 2001) brought with it notable changes within physical geography as a discipline. The quantitative revolution influenced human geography as well.

As a discipline, military environmental geography fits within environmental geography located between human geography and physical geography, as illustrated in Figure 1.2.




Source: Castree, Demeritt & Liverman (2009: 2)

Figure 1.2 Environmental geography at the interface of the two main branches of Geography

Coincidentally, it is also from about this time that the publication *Silent Spring* (Carson 1962) played an important role in expanding environmental awareness. From the 1960s onwards, environmental awareness and concern about the human impact on the natural environment began to draw scholars in the social sciences to investigate people's environmental knowledge, attitudes, behaviour and means to minimise their impact on the natural environment (Moolman 2015). As mentioned in Subsection 1.1.1, this increasing environmental awareness and concern inevitably led to the emergence of military environmental management. The shifts in Human Geography made provision for ecological concerns (Oelofse & Scott 2002).

The ecological and geographic approaches are used in dealing with military environmental problems (Jacobs, Janse van Rensburg & Smit 2002; Magagula 2014; Smit 2017). The ecological approach recommends the application of appropriate environmental management programmes, policies and strategies (Shamim 2016). The geographical approach refers to the use of geographic techniques supported by Geographic Information Systems (GIS) as a framework for understanding our world and applying geographic knowledge to solve human problems and guide human behaviour toward the environment (Shamim 2016).

This is in line with the holistic geographic approach denoted by the Military Geography discipline which points out that MG is linked to environmental geography (Jacobs, Janse van Rensburg & Smit 2002). MG "includes physical, human, regional and environmental geography, as well as how geographers use tools such as cartography, satellite remote sensing and GIS to help in solving military-related problems" (Jacobs, Janse van Rensburg & Smit 2002:195). The ecological approach suggests that the relationship between humankind and the natural environment should be symbiotic and neither exploitative nor suppressive (Shamim 2016). The relevance of this approach in the military is explicitly illustrated by Godschalk (1996b), who states that military activities and environmental concerns should be managed in order to complement and reinforce each other. This study fits into an ecological approach as it explores the prevalent drivers of effective environmental management in the AWMU in the WCR.

## 1.9 GEOGRAPHICAL PHILOSOPHICAL APPROACHES

In general scientific practice, "there is no research that takes place in a philosophical vacuum" (Kitchin & Tate 2000:4). Thus, subsection 1.9 briefly discusses the philosophical underpinnings of the current research. Neuman (in Smit 2017) maintains that philosophical approaches to scientific inquiry include positivism, interpretive and critical paradigms. In the same vein, Unwin (in Kitchin & Tate 2000:6) "uses Habermas's taxonomy of the different types of science to structure his discussion of approaches within geography". Kitchin and Tate (2000) further state that empirical, analytical science, historical-hermeneutic and critical science differ in relation to how knowledge and human action are mediated. Holt-Jensen and Johnston (in Smit 2017) concur with Habermas's taxonomy of the three types of science shown in Table 1.1. This table shows geographical philosophical approaches or schools of thought within the three types of science.

Table 1.1 Types of sciences and geographical approaches

| Empirical-analytical science | Historical-hermeneutic science | Critical science |
|---|---|---|
| Empiricism | Behaviourism | Marxist approaches |
| Positivism | Phenomenology | Realism |
| | Existentialism | Postmodernism |
| | Idealism | Post-structuralism |
| | Pragmatism | Feminism |

Source: Adapted from Kitchin & Tate (2000)

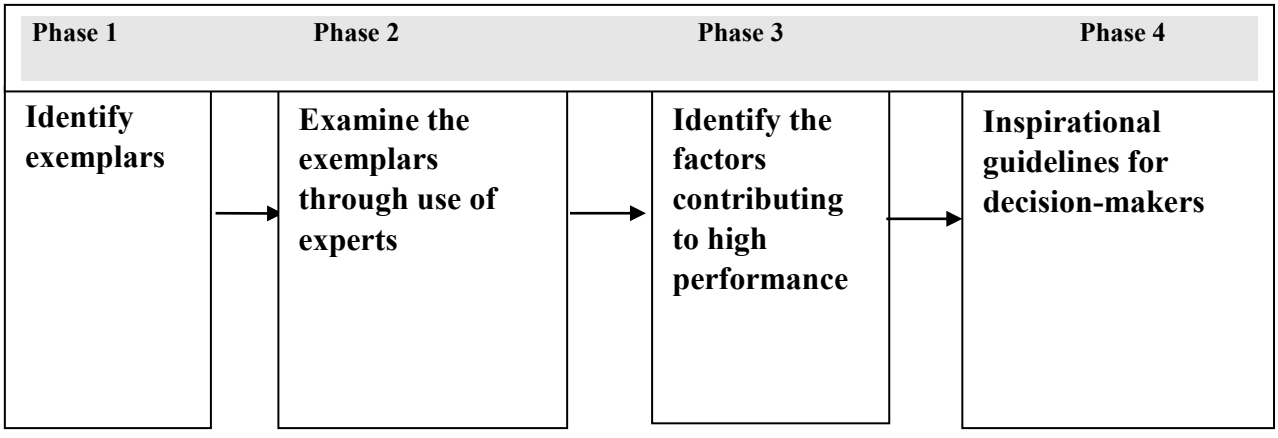
Each philosophical approach has three main elements: ontology, epistemology and methodology (Christie et al. 2000). These three elements are discussed in detail in Chapter 3. Babbie & Mouton (2008) maintain that a paradigm is the identification of the basis used to construct a scientific inquiry. Furthermore, paradigms are relevant in research because they hold the assumptions that guide the thinking behind the research. The current study has followed a realism paradigm. Realism research concerns itself with asking the causes for a particular result that are found because the observed findings are mere "outcroppings" of a more in-depth, unobserved, or unobservable reality Neuman (in Sobh & Perry 2006:1201). In this study, the mechanisms that lead to a particular event and experience are referred to as the drivers that lead to effective environmental management. The observed findings, such as environmental awards from AWMU, are only the visible manifestation of what drives environmental management. To fully know the drivers of effective EM in the AWMU, an understanding of a deeper reality (unobserved or unobservable) is necessary. Thus, the realism paradigm was considered suitable for the current study since the researcher is concerned with identifying the drivers that are operating in these military units and the ways they interact to achieve effective environmental management.

## 1.10 FRAMEWORK FOR IDENTIFYING THE DRIVERS OF ENVIRONMENTAL MANAGEMENT

This study seeks to identify drivers of effective environmental management from AWMU in the WCR. Christmann (2000) reports that organisations can achieve effective environmental management by implementing specific "best practices" (drivers). Drivers of effective environmental management can be identified from case studies of an organisation that have been successful in environmental management (Smart 1992; Shrivastava 1995; Christmann 2000). In the current study, the AWMU is considered an example of such case studies. According to authors such as Bardach (1994; 2004), Bretschneider, Marc-Aurele & Wu (2005) and Vesely (2011), improving the understanding of the factors contributing to EM in a public organisation is best achieved through the application of the best practise research approach. The best practise approach will be the framework for this study. It is based on the idea that instead of formulating an ideal state to be reached, it is better to identify and develop what is proven to be effective or work well (Vesely 2011). An understanding of the drivers helps to avoid wasting resources on reinventing the wheel by learning from others under comparable circumstances (Spencer et al. 2013).

Jennings Jr (2007:73) identified five approaches that can be used to identify best practices or drivers: an examination of high-performing organisations, the government performance project approach, synthesis of the literature approach, use of experts, and the scientific evidence approach. The military units or organisation that display best practices are referred to as exemplars (Vesley 2011). Using the best practices research approach, drivers that have proven to be effective can be identified, examined and communicated (Bardach 1994, Christmann 2000, Bretschneider, Marc-Aurele & Wu 2005). Vesely (2011) warns that two conditions must be met: completeness of cases and comparability of those cases. The condition of completeness states that to identify drivers, all comparable examples from a given area must be included in the sample, while the condition of comparability states that examples in a given set are comparable when it comes to actions, outcomes and the context in which they exist (Vesley 2011). In this study, AWMU in the WCR will form the population of the study.

Figure 1.3 is a graphic representation of the framework followed to identify drivers of EM in the WCR and shows the four phases followed in this research. Phase 1 was the first step, where the researcher identified military units that have drivers of effective environmental management that appear to work. In this study, these exemplars were identified as AWMU in the WCR. Phase 2 involved a process of interviewing BEMs and RFIMs in the WCR and examining the underlying factors. Phase 3 entailed the identification of the factors driving or contributing to effective environmental management. Phase 4 shows a possibility that the results of this study could potentially be used to influence decision-makers when formulating environmental guidelines.




Sources: Bardach (1994; 2004); Bretschneider, Marc-Aurele & Wu (2005); Vesely (2011)

Figure 1.3 Framework for identifying the drivers of EM in the AWMU in the WCR

## 1.11 RESEARCH DESIGN

The research design is the blueprint for the process of research from data collection to the analysis of that data (De Vaus 2001; Babbie 2004). Figure 1.4 shows the design of this study.

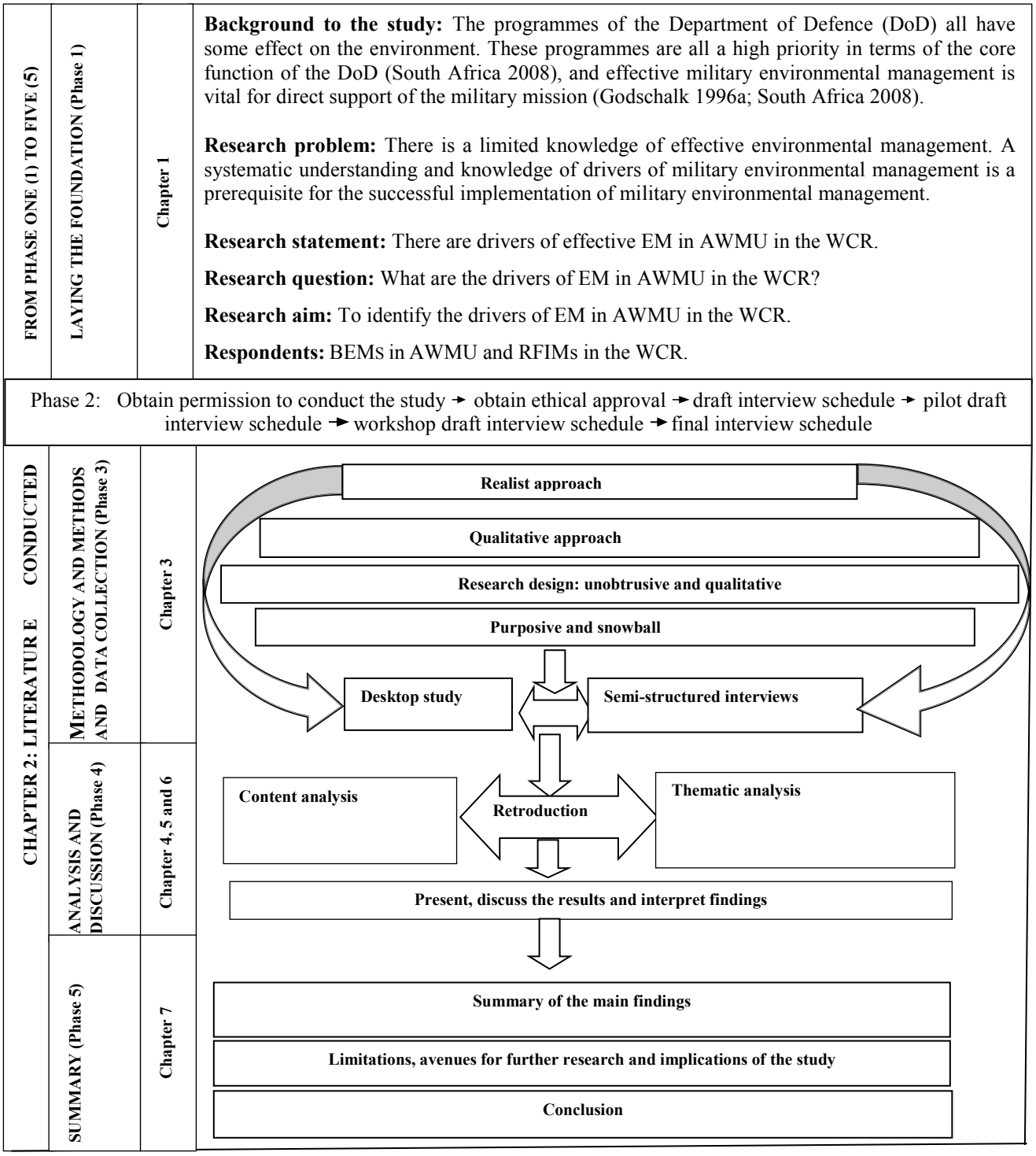



Figure 1.4 Research design for investigating drivers of environmental management in AWMU in the WCR

The research design implies the entire plan of the research. The current study was carried out in five phases as shown in Figure 1.4. In Phase 1, a background of the study was conducted that led to the identification of the research problem, problem statement, research question, research aim and unit of analysis. During Phase 2, the researcher commenced with the process of obtaining ethical approval from Stellenbosch University through its Faculty of Military Science and institutional permission from the SA DoDMV through the RFIM. This was followed by the development of a draft interview schedule and pilot interviews which led to a workshop of draft interview schedule and the final interview schedule. In Phase 3, the focus shifted to the research paradigm approach, methodology and methods and collection of data for the study. Phase 4 saw the analysis of the data collected and a discussion of the results. In Phase 5, the summary of the main findings, implications of the study, limitations of the study, avenues for further research, and conclusion were discussed. Furthermore, a critical review of relevant literature formed an essential part of each phase of this research.

## 1.12 THESIS OUTLINE

The thesis is organised into seven chapters. Chapter 1 lays the foundation of the study and reviews the background to military environmental management followed by the rationale for the study, research question, research statement and the overarching research aim. A brief overview of research methods and methodology, the scope of military geography and environmental geography as well as the geographical approaches are also discussed. The framework for identifying drivers of environmental management and delineation of the study conclude the Chapter 1. Chapter 2 critically reviews the concept of "environment" and discusses military interaction with the environment, military environmental management in South Africa, and provides an analysis of the drivers of environmental management. Chapter 3 describes the methodology, design, methods and instruments used to answer the research question. Chapters 4, 5 and 6 present and discuss the findings and results of the study for the service profile of respondents, annual environmental awards, environmental policies, environmental plans and programmes, monitoring mechanisms and the general perceptions of the respondents. These chapters present the actions of participants in relation to environmental management within military bases and land under their control. The findings and results are either complemented or contradicted by information and understanding gained from the literature review. Chapter 7 summarises the main findings, identifies the implications of the study, limitations of the study, avenues for further research and draws conclusions.

# CHAPTER 2: MILITARY ENVIRONMENT AND ENVIRONMENTAL MANAGEMENT

Most military activities can have a damaging effect on the environment (South Africa 2008). The problem caused by this impact is of increasing importance (Goldblat 1999). Evidence of adverse military impact on the environment dates back to the inception of wars (Westing 1980). The growing realisation of the damaging effect on the environment has triggered researchers to study the interaction between humankind and the environment (Moolman 2015), while governments globally began to promulgate environmental policies for regulating both peacetime and wartime operations (Goldblat 1991; Shrivastava 2001). Modern-day defence forces are therefore expected to mitigate their impact on the environment through the practice of effective environmental management (EEM) (Smit 2009; Magagula 2014). Smit & Mokiri (2016) noted that the South African Department of Defence and Military Veterans (DoDMV) followed the international trend to ensure sound and sustainable utilisation of the environment, as well as the territories under its control and within which it operates. This chapter clarifies the concept of "environment", discusses military interaction with the environment and explores military environmental management (MEM) in South Africa. The chapter is concluded with an analysis of the drivers of EM.

## 2.1 THE ENVIRONMENT

Section 2.1 briefly explores the concept of "environment" and its definition as applied throughout this study. The exploration of the concept of "environment" is followed by a discussion on environmental management.

### 2.1.1 Exploring the concept of "environment"

According to Jhansi & Mishra (2013), the term "environment" includes physical place, as well as the resources of land, water and air. Dreyer & Loubser (2014) assert that the environment is sometimes seen as surroundings that are human-made and natural within which human beings interact. This definition suggests that the environment does not include human beings yet is a place where humans interact. However, Bowling & Godschalk (in ESWG 2006) maintain that the environment is not just the various elements (e.g. air, water and land), but instead a dynamic interaction between the different elements, as well as factors such as humans, animals and human-made structures.

This means that humankind may/should not be seen as disconnected from the environment. Based on the above definitions, the concept of "environment" appears to be inherently complex. The complexity of "environment" means that its rather limited or exclusive definition requires a holistic redress. The legal definition in South Africa (SA) (Strydom & King 2009:4) views the concept of "environment" as the surroundings within which humans exist and that are made up of:

(i) the land, water and atmosphere of the earth
(ii) micro-organisms, plant and animal life
(iii) any part of (i) and (ii) and the interrelationship among and between them and
(iv) the physical, chemical, aesthetic and cultural properties and conditions that influence human health and wellbeing.

The South African White Paper on environmental management policy echoes the above definitions as it refers to the term "environment" as the conditions and influences under which an individual or thing exists, lives or develops (South Africa 1996b). Thus, the legal definition of the concept "environment" in South Africa encapsulates all the relevant elements, highlights their interactions and is applicable to all spheres of human influence, including the military. Consequently, this legal definition will be used throughout this study as an operational definition.

### 2.1.2 Environmental management

Environmental management (EM) is a crucial element in ensuring the positive environmental performance of an organisation (Wang & Wu 2013). In the early eighties, the United Nations Environment Programme (UNEP) defined "environmental management" as the control of human activities that have potential impact on the environment (UNEP 2000). Fuggle & Rabie (cited in Oelefse & Scott 2002) use a similar definition where they view environmental management as the actions aimed at minimising the potential human impact on the environment. Davies (2001) cites EM as the implementation of programmes for controlling the adverse effect of humans on the environment. According to Oelefse & Scott (2002), EM is the application of human skills and technology to prevent potential damage to the environment as a consequence of human activity. Furthermore, Hale (1997) explains environmental management as a methodology for managing the operations of an organisation in an environmentally responsible manner. Hale (1997) introduced the methodology dimension in defining environmental management in addition to the skills and technological aspect mentioned by other scholars.

Wang & Wu (2013) define the term "environmental management" as the sensible utilisation and management of environmental resources cost-effectively and sustainably. According to the DoDMV environmental implementation plan (EIP) (South Africa 2008:4), EM means the "management of the natural environment including the interaction between plants, animals, humans, their actions (e.g. military activities) and other elements in their natural environment". The definition by the EIP for South African National Defence Force highlights the elements involved in environmental management and does not indicate how EM is done as other scholars above suggest. Thus, in this study, environmental management is operationalised as human action, humans' use of knowledge, skills, implementation of programmes, methods and technology within the environmental policy framework to minimise the possible adverse effect of human (in this case, military) activities on the environment.

## 2.2 MILITARY INTERACTION WITH THE ENVIRONMENT

Military interaction with the environment occurs during both armed conflict and peacetime operations (South Africa 2008). The time spent by the military in armed conflict is generally less than the amount of time spent doing peacetime activities (Smit 2017). This section briefly describes military interaction with the environment during both armed conflict and peacetime operations.

### 2.2.1 Military interaction with the environment during armed conflict

Militaries have been impacting the environment since their inception. According to Finch (1996), some of the early examples where the environment suffered at the hands of the military include the following:

(i) The battle of Delium in 424BC, where Athenians destroyed local vineyards and agricultural fields;
(ii) The 2nd century battle between Romans and Carthaginians which saw the Romans destroy crops and poison the soil;
(iii) The destruction of dikes to flood swamps and low-lying areas by the Dutch in the 17th century and Chinese during the Sino-Japanese War.

The threat to the environment posed by warfare has increased throughout history as nations have developed more sophisticated means of waging war (Westing 1980). These military actions affected the natural landscape and led to significant environmental deterioration and agricultural decline (Lawrence et al. 2015).

The 20th-century examples of military impact on the environment include the Vietnam War, in which the United States utilised chemical defoliants, bulldozers and bombs to destroy Vietnam's forests, including 54% of its mangrove timberlands. During the Gulf War, Iraq set the oil wells on fire, thereby polluting the Persian Gulf and vast areas of air (Ansari 1996). During World War II and Operation Desert Storm, animals slaughtered to resupply armies became military targets. In the late 1990s and early 2000s, the civil conflict in the Congo reduced the country's wildlife, killing thousands of elephants, gorillas and okapis (UNEP 2000) during the liberation struggle. These are but a few examples that demonstrate that military actions are damaging to the environment, especially during war. Thus, though armed conflict usually lasts for only a short period compared to peacetime operations, military actions can transform landscapes, destroy living organisms, and pollute oceans and the atmosphere (Closmann & Mauch 2004).

### 2.2.2 Military interaction with the environment during peacetime

The military is expected to accept the responsibility of environmental stewardship and to assist other nations with sustainable environmental practices as part of military operations other than war (Finch 1996). Thus, the military needs to understand the potential environmental impact of its activities (Finch 1996). Increased environmental awareness and human impact on the natural environment have drawn the interest of scholars in the social sciences to investigate means to minimise the negative impact on the natural environment (Jhansi & Mishra 2013). Consequently, there has been numerous research endeavours conducted regarding the interaction between humans and the environment. In peacetime, the military interacts with the environment through military training, maintenance of military equipment and buildings, manufacturing and production of armaments, weapon testing, military waste disposal programmes, military operations, land use and exercises (Jones et al. 2002; Smit 2017). All these activities have some effect on the environment, and their impacts are diverse (South Africa 2008). The impact on the environment associated with the military activities mentioned above includes, yet are not limited to the following:

(i) Disturbance of the physical environment, which is evident through compacted soils, destruction of natural vegetation, soil erosion and ecosystems (Westing 1980; Certini, Scalenghe & Woods 2013);

(ii) Effect on the surface substrate and subterranean water resources through oil spillages, armament debris and unexploded ordnance (South Africa 2008);

(iii) Accumulation of hazardous waste and solid waste such as heavy metals, corrosives, and solvents (Westing 1980; South Africa 2008);

(iv) Negative impact on marine life as a result of naval training exercises, disposal of waste at sea, toxins derived from paint associated with naval vessels (Scott 2007);

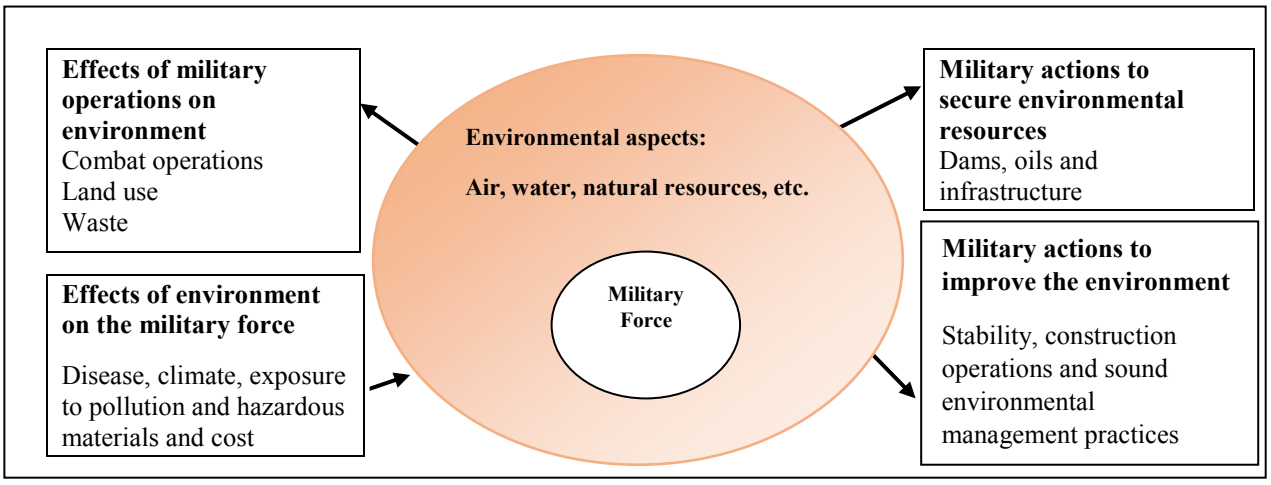
(v) Generation of atmospheric pollution from engine emission (aircraft, combat vehicles and naval vessels) (Westing 1980; Lawrence et al. 2015);

(vi) Destruction of wildlife during military training exercises (South Africa 2008);

(vii) Introduction of invasive species due to the extensive mobility of aircraft and naval vessels as species transport agents over distant geographic locations (South Africa 2001);

(viii) Adverse effect on wildlife as a result of military noise (noise pollution); for example, military noise can damage the hearing ability of animals and decrease their survival chances since animal communication is essential for reproduction (Larkin, Pater & Tazik 1996).

Although the effects of military activities on the environment can be seen throughout history and are well documented (Finch 1996), "the environment may also foster some constraints on military activities" (South Africa 2008:16). Mosher et al. (2008) illustrated the notion of interaction between the military and environment. Figure 2.1 displays some of the effects of the environment on the military force, such as diseases, climatological hazards, and exposure to pollution, hazardous materials and cost. These environmental factors can impact the health and safety of military forces, as well as influencing the ability of a military force to achieve their mission (Mosher et al. 2008).




Source: Adapted from Mosher et al. (2008: 3)

Figure 2.1: The interaction between military forces and the environment

Moreover, birds may collide with aircraft and result in the loss or damage of military equipment (South Africa 2008). Degraded landscapes as a result of soil erosion can lead to training areas being inaccessible for force preparation (Ncubukezi 2014). Though this is the case, Godschalk (1996b) points out that the military activities and the environment need not be seen as incompatible concepts. Military forces are "intimately dependent on the environment in which they operate" (Godschalk1996b:1). Figure 2.1 shows that military activities affect and are affected by the environment in their area of operations.

During peacekeeping missions, the protection and improvement of the environment where soldiers are deployed may increase trust and co-operation amongst the local population towards the military (Smit 2017:31). The converse holds true, that mission success may be compromised by local inhabitants' distrust of the visiting/"intruding" peace-keeping force's disregard for their host environment. The military and the environment can be compatible provided they be managed to complement and reinforce each other (Godschalk1996b:1). The following sections discuss the development of military environmental management in South Africa.

## 2.3 MILITARY ENVIRONMENTAL MANAGEMENT IN SOUTH AFRICA

This section discusses the background and development of MEM, and is followed by the environmental implementation plan for Defence, and the application of environmental management in the DoD.

### 2.3.1 Background and development of military environmental management

Magagula (2014:144) asserts that "governments around the globe have become aware of the increasing environmental issues and the need to manage these issues effectively". These heightened environmental concerns paved the way for environmental laws and regulations to be directed at the military sector to promote environmental management within their respective properties (Army US 2007; Ramos & De Melo 2005). New laws signified that militaries were being compelled to be accountable and to accept stewardship for the environment under its control and within which it operates (Potgieter 2001; Shrivastava 2001; Mosher et al. 2008; South Africa 2008). Military responsibility for the environment emanated from the fact that militaries are using vast sectors of land in their respective countries. By nature of its activities, they have the potential to damage the environment if not managed effectively (Godschalk 1998; Linkov & Ramadan, 2004; Smit & Mokiri 2016).

Countries such as the United States of America responded quickest to the growing environmental awareness with the National Environmental Policy Act of 1970 (NEPA) (Godschalk 1998). Thereafter, a variety of environmental laws were enacted, and environmental issues in the South African military have followed the international trends by making a gradual shift from being treated on an *ad hoc* basis to be fully integrated into all military activities (Curkovic, Sroufe & Melnyk 2005; Smit & Mokiri 2016).

The first formal instruction in the SADF (now known as the SANDF) to formally take care of the environment was issued in 1977 (Godschalk 1996a; Smit 2009). Following this instruction was the promulgation of the internal policy to manage environmental matters (Godschalk 1998; South Africa 2008; Smit 2017). The first internal policy encompassed a "wide range of subfunctions such as Ecological Mangement of training areas, Base Environmental Management, Cultural Resource Management, Environmental Research and Education" (Godschalk 1996a:1).

As the environmental conversation gradually intensified into the 1980s, the South African government published a White Paper on national policy regarding environmental conservation with the aim of formulating a national policy regarding environmental conservation (Strydom & King 2009). This led to the Environment Conservation Act (Act No. 100 of 1982), which in turn gave effect to the statutory council for the environment. The statutory council served as an advisory council to the Commander in Chief on environmental issues within the South African context (Strydom & King 2009). In 1983, the military leadership showed their commitment towards environmental issues by introducing annual military environmental awards (South Africa 2008). These awards aimed to encourage the military units and individuals to consider environmental issues in their work (South Africa 2008).

Growing national concern for the environment in 1989 led to the enactment of the Environment Conservation Act (ECA) (Act No. 73 of 1989) in South Africa, giving effect to the protection of the environment, pollution prevention and waste management, to name a few (Strydom & King 2009; Smit 2017). Section 2 of the ECA made provision for the determination of environmental policy to guide decision-making (Sowman, Fuggle & Preston 1995). In the same year (1989), the concept of integrated environmental management (IEM) was adopted in South Africa (Strydom & King 2009). The approach of ECA was purely conservational (Godschalk 1998; Smit 2017). The introduction of the concept of integrated environmental management in South Africa gave the military an alternative to the purely conservational approach.

In a purely conservational approach, the environmental function is seen as separate from a military mission, with the primary focus on the conservation of natural resources on military land (Godschalk 1996b). Furthermore, the concept of IEM led to an investigation into a much more comprehensive environmental approach in the DoD, developing into a long-term strategy for environmental services in the SANDF (Godschalk 1996b). The long-term strategy gave effect to the shift in environmental approach. Table 2.1 illustrates the shift in the DoD from the old approach to the new approach regarding environmental considerations.

Table 2.1 Illustration of the old and new approaches toward the environment

| Key elements | **Old approach** | **New approach** |
|---|---|---|
| Mission | Conservation | Environmental Management |
| Function | Secondary, over and above | Integrated |
| Emphasis | Environment Resource Management | Military Integrated Environmental Management |
| Military Involvement | Low | Concentrate |
| Environmental Service Responsibility | Specialist | Commander |
| Monitoring | General | Auditing |
| Education | Awareness; *ad hoc* | Training; integrated |
| Research | General environmental | Environmental Impact and Management |
| National effort | Stand-alone | Integrated |
| External co-operation | Loose | Structured |
| Environmental services personnel | National servicemen | Permanent force |

Source: Smit (2017:40)

The approach to environmental issues thus shifted from being conservation oriented to environmental management orientated. The new approach to environmental issues did not view environmental management as a separate function from the military mission, but rather as an integrated function into all military activities from planning to implementation. Thus the emphasis shifted to military integrated environmental management instead of the old environmental resource management (Godschalk 1996b).This meant that the military was expected to pay more attention to

environmental issues in the new approach compared to the old approach. Another essential shift brought about by the new approach was that unit commanders, rather than the environmental specialist, would be held responsible for environmental issues. This option seems not to have yielded the expected results (Magagula 2014); the environmental service recruited personnel on a permanent basis but they were not necessarily as skilled as the suitably qualified national servicemen had been. Monitoring now became structured and done on a continuous basis through audits at military bases. The old environmental approach conducted environmental education on an *ad hoc* basis, while, with the new approach, provision is made for environmental education to be integrated into training. The new approach also paved the way for research on environmental impact and management. The challenges facing the new approach are limited budgets and a lack of skilled environmental personnel. These two factors thus undermine the environmental commitment of the SANDF (Magagula 2014). The SANDF's responsibility to ensure environmentally sustainable management of facilities and activities has not changed, despite these challenges (Godschalk 1996b). Instead, many initiatives regarding military environmental management and the use of the military environment have emerged.

### 2.3.2 Environmental implementation plans for Defence

In the early 1990s, the SANDF adopted a broad strategy for environmental services and functional strategies (South Africa 2001). These strategies advocated for military integrated environmental management (MIEM) (South Africa 2001; 2008). These developments made it possible for Environmental Advisory Forums (EAF) to be established in 1993 (South Africa 2008). The EAF provided platforms for the SANDF to utilise external environmental expertise. According to Godschalk (1996a), the external expertise involved in the forums were sourced from other relevant State department, provincial departments, universities or environmental NGOs. Their involvement was aimed at advising the military on its environmental task (Godschalk 1996a). In 1994, the conversation about environmental management in the SAM coincided with the dawn of democracy in South Africa (Smit 2017). "From 1994 environmental inputs were included in the strategic management process" of the SAM (Godschalk 1998:3) and in 1996 the new constitution was promulgated. It covered aspects of environmental management and land use in South Africa (Smit 2017). In the same year, the SANDF introduced the concept of green soldiering and embarked on the route of MIEM (Potgieter 2001:2). The term "green soldiering" aimed to ensure the environmentally sustainable management of military activities and facilities (Godschalk 1998:2).

Table 2.2 shows some of the important Acts promulgated to promote environmental protection, pollution prevention and sustainable use of natural resources.

Table 2.2 List of South African Environmental Acts and their respective years of promulgation

| |
|---|
| Environment Conservation Act (ECA) (Act No. 73 of 1989) |
| National Environmental Management Act (NEMA) (Act No. 107 of 1998) |
| Marine Living Resource Act (Act No. 18 of 1998 |
| National Water Act (Act No. 36 of 1998) |
| National Environmental Management: Protected Areas Act (Act No. 57 of 2003) |
| National Environmental Management: Biodiversity Act (Act No. 10 of 2004) |

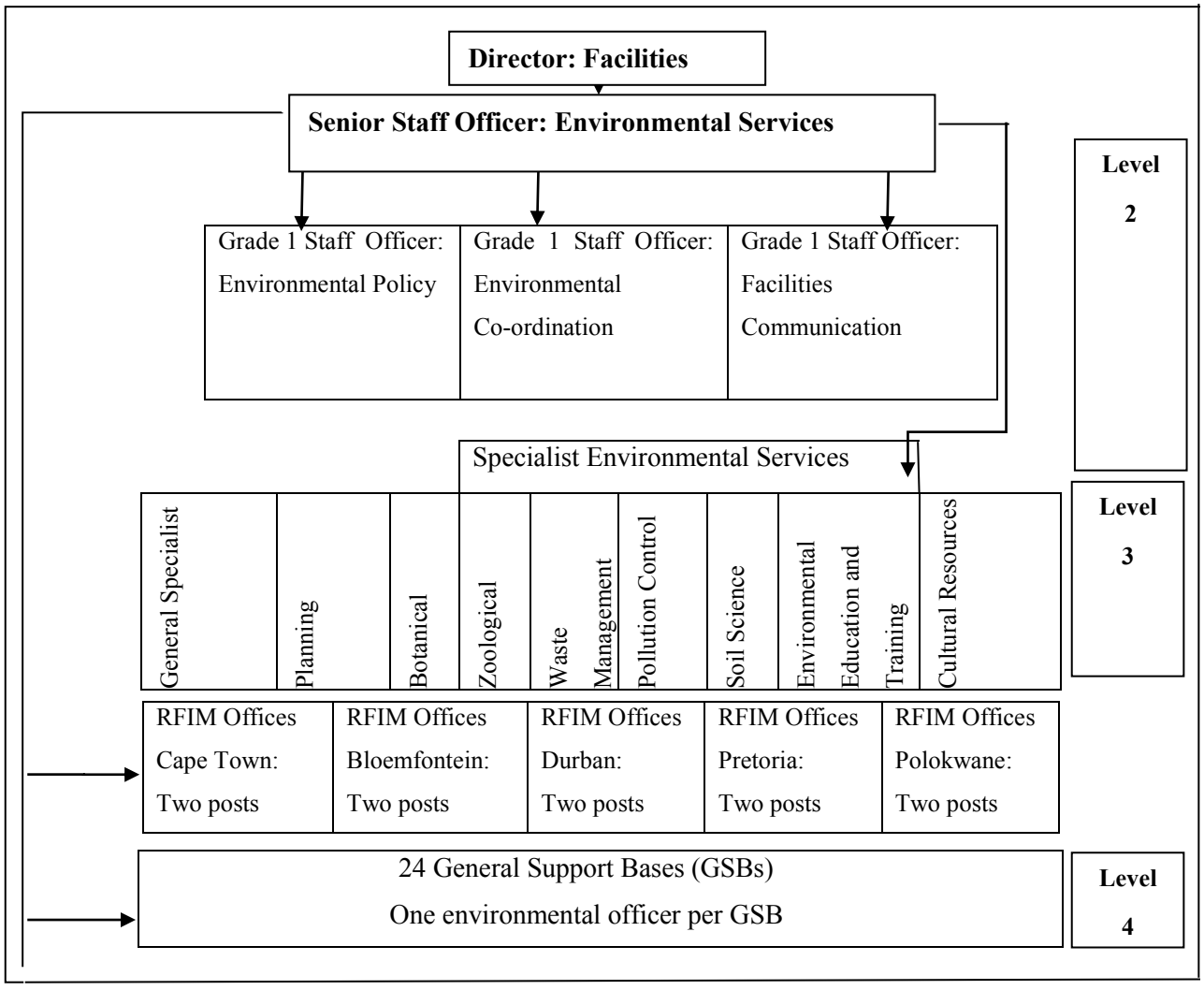
Source: Strydom & King (2009:422)

The National Environmental Management Act (NEMA) (Act No. 107 of 1998) became the framework environmental legislation for South Africa in 1998 and the DoD also had to abide by it (Godschalk 1998). NEMA made provisions that ensured that all state organs with actions that may impact the environment negatively should compile environmental implementation plans (Kidd 1999; Jacobs, Van Rensburg & Smit 2002). The DoD has since published two Environmental Implementation Plans (EIPs), in 2001 and 2008 respectively (South Africa 2008). Recent research has noted that though the SA DoDMV has an impressive set of environmental policies and plans, it is still not fully compliant with legislative provisions (Magagula 2014).

### 2.3.3 The application of environmental management in the DoD

The overall aim of the EIPs for DoD is to provide an instrument for co-ordinating and harmonising environmental policies, plans and programmes and decisions of various national departments, provincial and local spheres of government (South Africa 2001:10). In addition, the EIPs identify the functions of the SA DoDMV and associated impacts on the environment, the measures and mechanisms for dealing with issues related to the environment, capacity gaps and limitations, and means to improve the identified deficiencies (South Africa 2001; 2008). The Environmental Services, established in 1992 as part of a long-term strategy for the environment in the SANDF, are responsible for EIPs in the DoD (Godschalk 1996a), and resort under the DoD Logistic Support Formation Division. The environmental function in the SANDF occurs between Levels 2 and 4 (South Africa 2001). Directorate facilities is situated at Level 2 within the joint support division (Smit 2017). Sub-directorate Environmental Services at Level 2 is concerned with developing, formulating and promulgating environmental policies, procedures and guidelines, and the overall

management of environmental functions (South Africa 2001). There are senior staff officers and three Grade 1 staff officers dedicated to performing these functions (South Africa 2001). At the DoD Logistic Support Formation – Level 3 – a section Specialist Environmental Services exists. This section has nine environmental specialists. The Specialist Environmental Services section focuses on "general environmental services, environmental planning services, botanical services, zoological services, waste management services, pollution control services, environmental education and training services and, cultural resource services" (South Africa 2001:17). Five Regional Facility Interface Management (RFIM) offices have been established to serve SANDF military bases. In each region, there are two dedicated environmental posts at this level. Figure 2.2 indicates the structure of environmental services in the DoD.

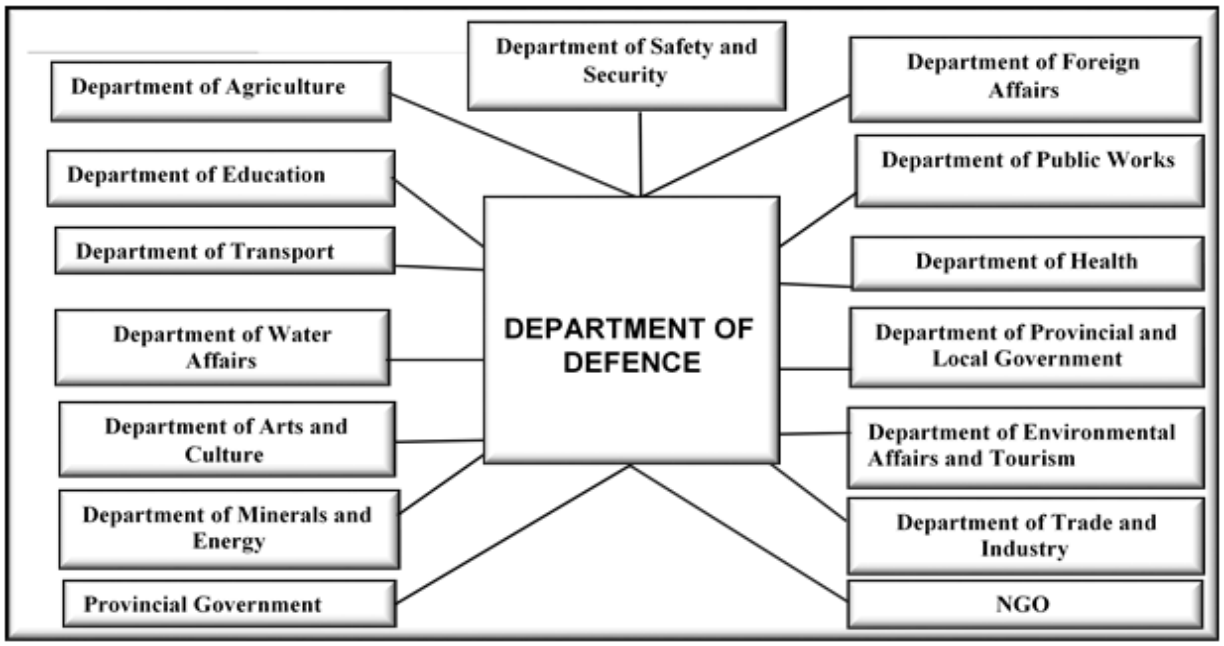



Source: Adapted from Smit (2017:3)

Figure 2.2 The structure of Environmental Services in the SANDF

There are five RFIM offices across South Africa. The Cape Town office caters for the Western Cape, the Bloemfontein office serves the Northern Cape and the Free State, the Durban office accommodates KwaZulu-Natal and the Eastern Cape, the Pretoria office covers Gauteng and the North West, while the Polokwane office takes care of the Limpopo and Mpumalanga (South Africa 2001). At Level 4 there are at least 24 General Support Bases (GSBs), with one dedicated environmental officer per GSB to support units, force structure elements and satellite offices when it comes to military environmental management. There is, therefore, a total of 47 dedicated environmental posts in the DoD to implement environmental policy.

The EIPs made provision for dedicated environmental officers in the SANDF to align the environmental management between the DoD and other national departments (South Africa 2001). The process of applying EIP in the SANDF commenced by identifying all the core functions and their potential impacts on the environment (South Africa 2001). The environmental service personnel evaluated the priority functions of the DoD according to section 2 principles of NEMA (South Africa 2001; 2008). In addition to this, the environmental sub-directorate formed an institutional arrangement between the DoD and other organs of state for environmental management (South Africa 2008). Figure 2.3 shows institutions that have a relationship with the DoD in terms of environmental issues.

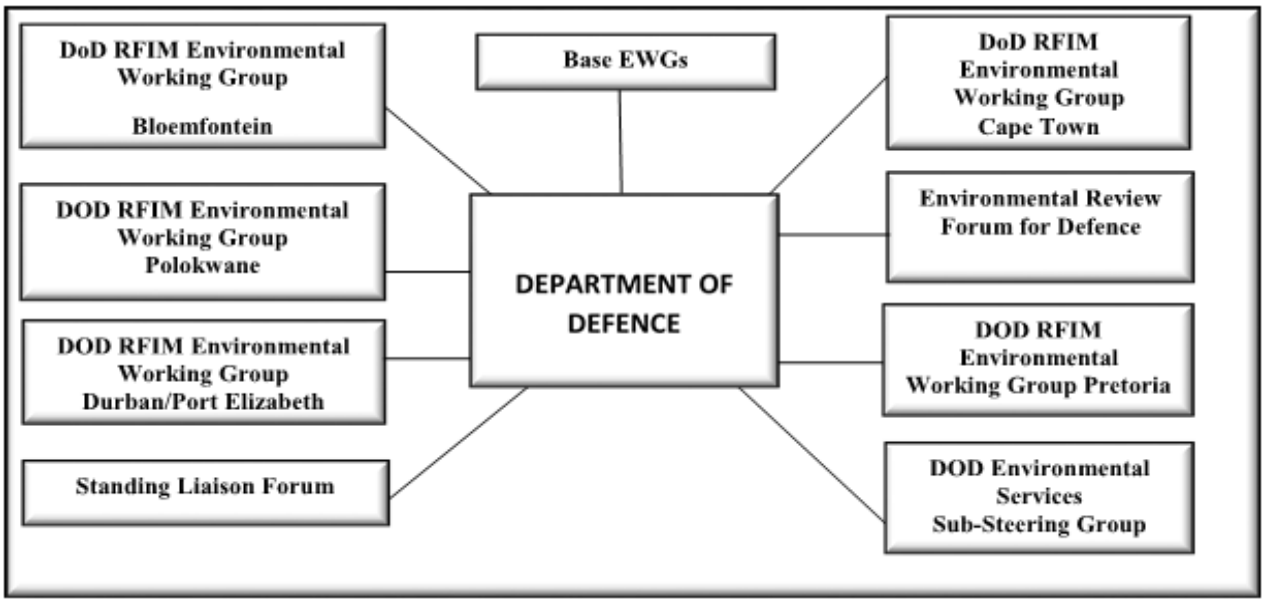



Source: EIP (2008: 56)

Figure 2.3 External co-operative governance relationships for the DoD

There are potential benefits for the DoD embedded in external co-operative governance illustrated in Figure 2.3. These benefits include interpretation of policies, EEM directives and keeping abreast of the best environmental practices (Magagula 2014:156). Van Blerk (2001) highlighted that the DoD's external linkages with organisations that have comprehensive experience could lead to improved environmental management within the DoD. For example, partnership with the Department of Minerals and Energy results in energy efficiency. Furthermore, empirical research shows that military units do not take full advantage of the potential benefits of the external co-operative governance (Magagula 2014). Though this is the case, the formal mechanisms for liaison,

such as environmental awards, still exist to address environmental management issues at the level of execution (South Africa 2008). There are also mechanisms for interaction within the DoD (South Africa 2008). Figure 2.4 illustrates internal co-ordinating mechanisms for the DoD.




Source: EIP (2008: 60)

Figure 2.4 Internal co-ordinating mechanisms for the DoD

The internal co-ordination mechanisms illustrated in Figure 2.4 are mainly instituted to formalise the application of environmental management within the DoD. These are important to the functioning of the EIP. The DoD Environmental Services Sub-Steering Group consists of representatives from the Environmental Services sections, the Animal Health and Environmental Health directorates of SA Military Health Services and the five RFIM Offices (South Africa 2008).

The primary goal of this group is to co-ordinate environmental services. It is located at Level 2 of the structure of Environmental Services (ES) in the SANDF (South Africa 2008). The chair for this group is the SSO of Environmental Services (South Africa 2008). Furthermore, the five RFIM offices shown in the structure of ES in the SANDF are led by Grade 1 Staff Officers (SO1) with the purpose of co-ordinating the function of environmental matters at base and regional levels (South Africa 2001, 2008). At the base level, base commanders lead base environmental working groups that consist of base satellite environmental officers, Occupational Health and Safety (OHS) and Environmental Health (EH). Base environmental working groups focus mainly on progress with environmental management, specific problem areas, new requirements and co-ordination of environmental management matters between bases and the operational level (South Africa 2008).

In addition to the above working groups, are the Environmental Review Forum and Standing Liaison Forum. The Environmental Review Forum (ERF) was formed to establish and develop an Environmental Management System (EMS) for the DoD (South Africa 2008). An EMS is a management tool used by organisations to identify adverse impacts on the environment, to protect the environment and to manage their daily activities in an environmentally sound manner (Wu et al. 2010). An EMS is meant to allow organisations to plan their environmental activities while simultaneously assessing and managing environmental aspects and potential impacts of environmental objectives and policies (Rao 2005). All the EMSs stress the need for continuous improvement in striving to protect the environment, not only for the current generation but also for future generations (Chavan 2005). According to Smit (2009), the draft EMS completed in 2004 was tested in a pilot project at 1Military Hospital and 2 Military Hospital, SAS Drakensberg, General Support Base Potchefstroom and Air Force Base Waterkloof. This particular pilot project was halted in February 2007 due to lack of progress (Smit 2009).

Smit (2009) further explains that guideline documents were revised given the results of the pilot project shortly after the pilot project was stopped. The ERF scrutinised the reasons for the failure of the pilot project and a new EMS is still to be developed for reviewing the department's environmental performance (Smit 2017). This ERF was established in 2001 with the aim to fully incorporate the environmental management principles in day-to-day activities of the DoD (South Africa 2008). However, to date, the new EMS is still to be published and implemented. The last internal mechanism is the Standing Liaison Forum (SLF) which involves co-ordination and co-operation among the functions of ES, EH and OHS (South Africa 2008).

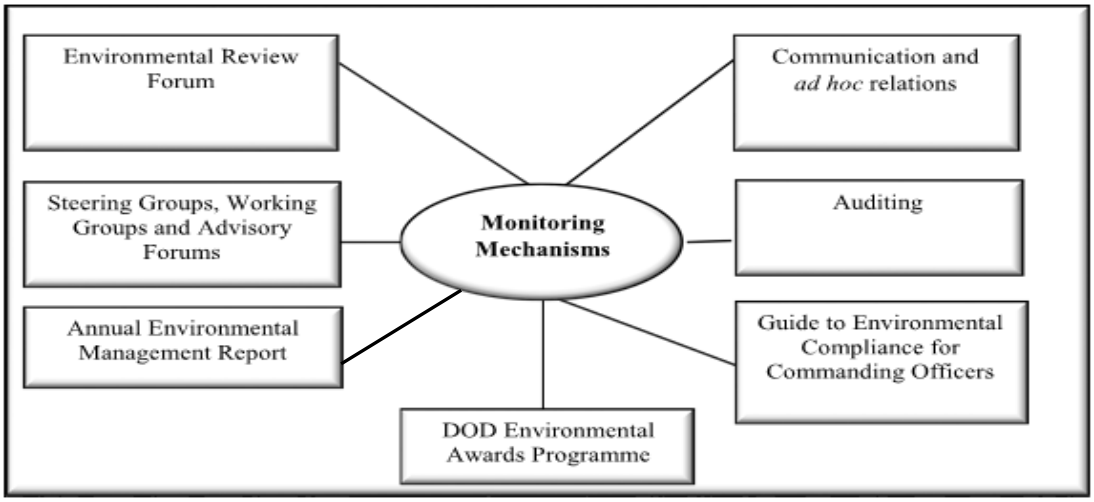
Environmental management within the DoD is practised through these internal mechanisms. To reinforce internal mechanisms and external co-operative governance, the DoD has embarked on international relationships as well (South Africa 2008). The DoD has made provision for a partnership and alliance between the Republic of South Africa (RSA) and the United States of America (USA). This alliance led to the establishment of the Defence Committee (DEFCOMM) in 1997. The DEFCOMM represented the RSA-USA Binational Commission (BNC) (South Africa 2008). The RSA-USA partnership paved the way for the Environmental Security Working Group (ESWG). This group is co-chaired by representatives from both RSA and USA (Smit 2017). The DEFCOMM exchanged information with the aim to develop MIEM with a specific focus on overlapping areas of concern (South Africa 2008).

The BNC has made significant progress to date; for example, the ESWG completed guides on the following: Integrated Training Area Management (ITAM), Base Conversion, Facilities Website Development, Environmental Education and Training (EE&T) for military commanders, Environmental Impact Assessment (EIA) in the military and Integrated Waste Management (IWM) in the military (South Africa 2008). In addition to these guides, several bilateral courses have been attended by more than a hundred South African soldiers (Smit 2017). Another partnership related to environmental management involved military members from the Southern African Development Community Countries. This partnership is known as the Interstate Defence and Security Committee (ISDSC) Logistic Work Group (South Africa 2008). The primary purpose for this group is similar to that of the RSA-USA BNC, which is to explore areas of co-operation and to share expertise. Though the DoD has taken all the above actions towards the structuring and implementation of environmental management, the SANDF experiences challenges in implementing the plans it has set for itself (Magagula 2014). The following section discusses how the DoD monitors its environmental management effort.

### 2.3.4 Mechanisms for monitoring environmental management in the defence force

The environmental implementation plans included, among other things, monitoring mechanisms to track the environmental performance of the DoD (South Africa 2008). The DoD Steering and Working Groups work hand in hand with advisory forums to monitor the environmental performance and provide RFIM personnel with insight and information regarding the management of potential impacts of military activities on the environment (South Africa 2008).

Figure 2.5 shows the mechanisms for monitoring environmental management. Furthermore, the steering groups, working groups and advisory forums provide expert advice in a consolidated effort to ensure effective environmental implementation (South Africa 2008).




Source: South Africa (2008:64)

Figure 2.5. Mechanisms for monitoring environmental management

The Annual Environmental Management Report (AEMR) is one of the mechanisms used to monitor environmental management. The AEMR is structured in such a way that it assists and empowers commanding officers to fulfil the role of environmental stewardship (South Africa 2001, 2008). The AEMR entails Base Environment (BE), Environmental Education and Awareness (EE & A), Cultural Resources (CR) and MIEM. The use of the AEMR at unit level is twofold: first, it provides a set of environmental management guidelines to each unit and, second, it can be used as an auditing mechanism through which units may measure their environmental performance (South

Africa 2008). At a level higher than the individual military unit, the AEMR is used as an official entry to the annual environmental awards programme (AEAP) (South Africa 2008).

AEAs were instituted to inspire military units and members of the SANDF to honour their responsibility towards the natural environment under their control (Letaoana 2006:36). There are eight environmental awards: the Rand Water Award for Water Efficiency, National Energy Efficiency Campaign Award for Energy Efficiency, Keep eThekwini Beautiful Award for Integrated Waste Management, Endangered Wildlife Trust Floating Trophy for Ecological Management, Caltex Floating Trophy for Base Environmental Management, Professor Kristo Pienaar Floating Trophy for Environmental Education and Awareness, SA National Parks Floating Trophy for Military Integrated Environmental Management, and the Conservamus Floating Trophy for Environmental Services in the DoD (South Africa 2008).

These awards are awarded to military units that have shown significant improvements or excellence in a category (Letaoana 2006). In addition to the above mechanisms, the DoD permits other national and provincial departments to monitor its environmental compliance, and views this arrangement as a monitoring mechanism called communication and *ad hoc* relations. Most national departments use the AEMR to monitor DoD environmental compliance (South Africa, 2008).

The DoD has identified three levels of auditing and monitoring implementation of environmental management measures, EM compliance and environmental performance (South Africa 2008). These three auditing levels are EMS audit, internal audit by defence inspectorate and external audit by the Office of the Auditor-General (OAG) (South Africa 2008). There is also a guide for OCs, and it is a formal monitoring mechanism that guides environmental compliance for Commanding Officers (OCs) (South Africa 2008). OCs may use these guidelines either to ensure responsible environmental performance, a tool for developing a deeper understanding of government's intent about sustainable development, or as a training aid for related military short courses. Potgieter (2001) states that military environmental management hinges on the DoD Environmental Policy Framework, the Environmental Policy Statement, as well as a set of guiding principles contained in the EIPs. These documents indicate the commitment of the DoD to accepting its stewardship role of the environment. Policy documents for the DoD clearly illustrate this commitment.

Despite the promulgated environmental policies of the DoD, and its commitment to accepting custodianship over the natural environment (Potgieter 2001), the DoD piloted the EMS but has not been able to implement it to date (Smit 2017). Moreover, Magagula (2014) confirms that the commitment of the DoD towards the environment is confronted with many challenges at execution level. Failing trends in military environmental management are contrary to the Corporate Environmental Policy Statement (CEPS) that requires the DoD to minimise the impact of its operations on the environment through a programme of continual improvement. However, if effective drivers of military environmental management (MEM) can be identified and developed, this can help rectify this unsatisfactory situation. Table 2.3 shows some of the examples of the policy documents guiding environmental management in the DoD.

Table 2.3 Environmental Policy Documents in use in the South African Defence Force

| **S/No** | **Policy documents in the South African National Defence Force** |
|---|---|
| 1 | Defence Review and White paper on Defence |
| 2 | The Broad Strategy for Environmental Services as well as Functional Strategies on Environmental Planning, Environmental Research, Environmental Education and Awareness Training, Base Environmental Management, Ecological Management and Cultural Resource Management |
| 3 | Guidebook on Environmental Considerations during Military Operations |
| 4 | Guidebook on the development and implementation of Environmental Education and Training in the Military |
| 5 | Environmental Guidelines on Field Sanitation during Military Training and Operations in the Department of Defence |
| 6 | Standardised environmental aspects for consideration during planning |
| 7 | A soldier's pocket guide to Environmental Responsibility |
| 8 | Guide to environmental compliance for general officers commanding and officers commanding |
| 9 | Standardised environmental aspects for consideration during planning |
| 10 | Guidebook on Integrated Training Area Management |
| 11 | Internal policy on nature and environmental management |
| 12 | Procedural guidelines on prevention and control of erosion |

| | |
|---|---|
| 13 | Procedural guidelines on incorporating environmental considerations in the planning of peace support operations |
| 14 | Guidebook on the conversion of military bases in South Africa |
| 15 | Guidebook on environmental impact assessment in the military |
| 16 | Integrated waste management in the military |
| 17 | Environmental Management Systems for Defence with additional mechanisms for monitoring implementation, performance monitoring indicators and the responsible implementing agent |
| 18 | Military Integrated Environmental Management |
| 19 | 2001 and 2008 EIP for DoD |

Source: Smit (2017:297)

## 2.4 DRIVERS OF ENVIRONMENTAL MANAGEMENT

Drivers of environmental management differ from organisation to organisation and are viewed as factors that influence and increase an organisation's environmental performance (Hassan & Ibrahim 2012; Reddy et al. 2013; Trianni et al. 2017). Kruger, Araujo & Curi (2017) describe drivers of environmental management as any natural or human-induced factors that directly or indirectly improve environmental performance. Clarke and Kouri (2009) have defined drivers of environmental management as factors that prompt an organisation to undertake environmental action. These definitions are similar to the one furnished by Wee & Quazi (2005), which states that a driver is a factor that initiates and motivates the organisation to achieve improved environmental performance. These drivers are considered good indicators of sound environmental management (Hassan & Ibrahim 2012). The definition of drivers seems to be debatable. Nonetheless, the above definitions seem to agree about the outcome achieved by drivers, which is improved EM performance. Thus, in this study drivers are defined as any factor that contributes to improved military environmental management performance.

As a general trend during the last three decades, environmental issues were receiving a continuously increasing amount of attention in public and private organisations (Parker, Redmond & Simpson 2009; Zailani et al. 2012), which lead to an interest in understanding what drives these organisations to embrace effective environmental management (Farneti & Guthrie 2009; Hossain, Rowe & Quaddus 2012). Drivers leading to increased performance should be identified and described (Trianni et al. 2017). These drivers are considered necessary to enable decision-makers and

managers to develop guidelines to mitigate or prevent adverse impacts on the environment (Diecidue 2008). Drivers are generally categorised into two groups, namely external drivers and internal drivers (Hoffman 2001; Delmas & Toffel 2004; Sharma & Henriques 2005). According to Tutore (2013), both external and internal drivers are responsible for pushing organisations to go green or to attain effective environmental management.

External drivers include stakeholders, suppliers, market influences, government regulations and other institutional agents such as industry groups. Internal drivers include management, employees, corporate values (Berardi & Renata 2015:113). Gifford & Nilsson (2014) argue that personal factors are also a variable that that can push an organisation towards effective environmental management. These personal factors include knowledge, training and education (Gifford & Nilsson 2014).
Dashore & Sohani (2013) believe that a better understanding of drivers of effective environmental management helps the organisation concentrate limited resources to enhance the drivers known to be effective. Thus, an organisation can implement and focus their effort on drivers that have been proven to be useful to reduce the adverse effects of their activities on the natural environment (Christmann 2000).

Shrivastava (1995) and Smart (1992) maintain that information about effective drivers is obtainable through case studies of the firms that are successful in executing their environmental strategies. This is consistent with what Wee & Quazi (2005) found when they developed and validated six drivers of environmental management that could be used by managers to improve their environmental management. The six drivers identified by Wee & Quazi (2005) include top management commitment to environmental management, the total involvement of employees, training, process design, supply management and information management. For some scholars, these drivers include a written policy statement, planning, implementation and operations, measurement and corrective action, auditing and review systems (Barnes 1996; Hersey 1998; Ramos & De Melo 2005).

Research conducted on the effect of small and medium enterprises on the environment identified six key drivers of effective environmental management: voluntary engagement, stakeholders, legislation, resources, motivation and knowledge (Elam 2000; Walker, Sisto & McBain 2008; Hassan & Ibrahim 2012). The context of their use as drivers appears to be critical (Mosher et al. 2008). That is, if the context is right, it is more likely that the drivers will elicit a positive response

(Zailan et al. 2012). Searcy et al. (2011) explored the drivers of organisations and found that their drivers were: corporate image, environmental improvement, gaining marketing advantage and improving relations with communities.

Chavan (2005) also observed that some organisations' drivers for environmental management aim at gaining market advantage and not so much at sustainable development. Liyin, Hong & Griffith (2006) explain that existing external drivers (such as government regulation) are inadequate for improving environmental performance if internal drivers do not exist. The results of Liyin, Hong & Griffith (2006) are consistent with the findings of Daily and Haung (2001), who highlighted the fact that internal factors such as top management support, environmental training, employee empowerment, teamwork and rewards systems are drivers of effective environmental management. The assertion of the relevance and importance of internal drivers for effective environmental management is further supported by Argyris (1998:99), who stated that "commitment is about generating human energy and activating the human mind. Without it, the implementation of any new initiative, policy or idea would be seriously compromised."

Public organisations, such as the military, are not influenced by some of the pressures that influence private organisations in terms of EEM (Kruger, Araujo & Curi 2017). However, they perform activities that impact the environment, so they must remain in step with civil society (Vreÿ 2004) and are thus equally expected to manage their impact on the environment effectively (NATO 2000). This assumption is corroborated by research into military environmental management in South Africa. According to Magagula (2014), drivers of military environmental management can include financial resources, internal and external linkages, as well as the appointment of knowledgeable and competent staff. The fact remains that, in the South African military context, limited research has been conducted into the drivers of military environmental management. Hence, there is a lack of knowledge about drivers of effective military environmental management, a problem investigated by this current research. In the literature, there is no clear consensus among specialists as to which are the main drivers of environmental management. This is the case because the institutional context has a strong influence on environmental practices (Berardi & Renate 2015). Table 2.4 shows some empirical studies conducted in search of drivers of effective environmental management and the drivers they identified.

Table 2.4: Empirical studies conducted in search of drivers of effective environmental management

| Study | Approach | Research results (identified drivers) |
|---|---|---|
| Daily & Haung (2001) USA | Qualitative Interviews | Top management support, environmental training, employee empowerment, teamwork and reward system as a key element for the implementation of environmental management. |
| Yirdoe et al. (2003) Canada | Quantitative Survey | Internal factors: to increase production efficiency, to increase working environment safety, and to promote company goodwill and integrity. External factors: compliance with existing government regulations, anticipating future regulatory requirements, anticipating future market demands, pressure from customers. |
| Zutshi Sohal (2004) Australia | Mixed methods Interviews and survey | Management leadership and support, top management commitment, cultural change and organisational vision, allocation of resources and champions. |
| Wee & Quazi (2005) Singapore | Mixed methods Synthesis of environmental management literature, interviews and survey | Top management commitment to environmental management, total involvement of employees, training, process design, supply management and information management. |
| Saizrbitoria,Landin & Jose (2010) Spain | Quantitative survey | Improve image, fulfil the law and regulation, improve environmental effectiveness, minimise environmental problems, improve competitiveness and satisfaction. |
| Psomas, Fotopoulos & Kafetzopoulos (2011) Greece | Qualitative interviewing of environmental managers | Improvement of company's image, increase in internal and external market share, use of the certificate as a marketing tool, increase in competitive advantage, environmental regulation, middle management commitment, top management commitment, environmental policy. |

| | | |
|---|---|---|
| Searcy et al. (2011) Canada | Qualitative group discussion | Top management support, environmental training, employee empowerment, teamwork and reward system as a key element for the implementation of environmental management. |
| Berardi & Renata (2015) Brazil | Quantitative Data survey | Command and control, suppliers, customers, market influences, corporate values, employee pressure and management goals. |
| Magagula (2014) South Africa | Qualitative data Semi-structured interviews | Lack of sufficient financial resources, competent staff and external linkages were significant shortcomings and challenges identified. The author revealed sufficient funding, competent personnel, legal framework, and external linkages as potential drivers of effective environmental management. |
| L Ncubukezi South Africa (2018) | Qualitative Data, Content analysis Semi-structured interviews | Question answered by the current study. |

It can be ascertained that the need for companies to adequately address environmental issues has increased due to either external or internal drivers (Shaw et al. 2005). In recent years, environmental management and continual improvement of environmental management have remained an organisational imperative for most organisations, including militaries (Ramos & De Melo 2005). Attainment of continual improvement and effective military environmental management within the constraints that are imposed from time to time by nature of the organisational mandate need to be prioritised (Wee & Quazi 2005). Magagula's findings suggest that there is a lack of knowledge about drivers that contribute to effective military environmental management (Magagula 2014).

Without a clear understanding of the drivers of effective military environmental management, successful implementation of military environmental management or continuous improvement of environmental performance will remain a formidable challenge for the DoD. The land controlled by the DoD is classified as a national asset (South Africa 2001), and Defence authorities all over the world recognise that sustainable environmental management is a vital aspect of keeping military activities effective in the long run (Ramos & De Melo 2005). The lack of knowledge about drivers of effective environmental management presents a problem to organisations entrusted with the land,

more specifically to militaries whose activities have a proven potential of damaging the environment in which they operate (Potgieter 2001; Magagula 2014). Table 2.4 shows that organisations have focused their resources on studying drivers of environmental management so that they can fulfil the responsibility of stewardship for the environment. The SA DoDMV needs to identify drivers of military environmental management to fulfil their stated commitment towards effective environmental management. This study aims to identify these drivers.

# CHAPTER 3: METHODOLOGY, RESEARCH DESIGN AND RESEARCH METHODS

Environmental challenges such as biodiversity loss, resource depletion and climate change, to mention a few, necessitate environmental management strategies. Institutions globally have put effort into managing the impact of their activities (Jhansi & Mishra 2013). Consequently, defence forces are also expected to effectively manage the environmental impact of their activities (Magagula 2014). Hence investigating drivers of effective environmental management with the aim to improve environmental performance in the DoD is essential. Dalkin et al. (2015) recommend that instead of observing evidence alone, it is necessary to understand the underlying causes of the observed evidence. This chapter describes the process followed in terms of methodology, research design, methods, data analysis and ethical research clearance. This process was followed in order to identify drivers of military environmental management.

## 3.1 METHODOLOGY

Kitchin & Tate (2000:6) explain research methodology as a "set of rules and procedures which can be used to investigate a phenomenon or situation within the framework dictated by epistemological and ontological ideas". Battacherjee (2012) and Babbie (2004) describes research methodology as a strategy that moves from underlying assumptions to research design and data collection. Research methodologies can be classified into qualitative, quantitative and mixed methods (Babbie & Mouton 2008: xxv). Table 3.1 contains various research methodologies of inquiry that can be used by researchers.

Table 3.1: Qualitative and Quantitative Methodology and Mixed Methodology**.**

| **Qualitative methodology** | **Quantitative methodology** | **Mixed methods** |
|---|---|---|
| Narrative research<br>Phenomenology<br>Ethnographies<br>Grounded theory studies<br>Case studies and interviews | Experimental designs<br>Non-experimental designs, such as surveys | Sequential<br>Concurrent<br>Transformative |

Source: Creswell (2009:12)

This study follows a qualitative methodology which is linked to the particular theoretical paradigm. A theoretical paradigm is the identification of the basis that is used to construct a scientific inquiry (Babbie & Mouton 2008).

Paradigms are relevant in research because they hold the assumptions that dictates the thinking behind the research. These paradigms include positivism, critical theory, interpretive, constructivism and realism. Each scientific paradigm has three main elements: ontology, epistemology and methodology. The current study followed a realism paradigm. Table 3.2 shows elements of the realism paradigm. Ontology focuses on the reality that shapes the standpoint of the researcher, while epistemology is the framework that helps the researcher understand how scientists understand what they know. The element of the methodology is understood to be the technique used by the researcher to discover the reality (Morgan & Smircich 1980; Bergin, Wells & Owen 2008).

Table 3.2 Categories of scientific paradigms and their elements

| **Paradigms** | **Element** |
|---|---|
| | |
| Reality is "real", but only imperfectly and probabilistically apprehensible, so triangulation from many sources is required to try to know "reality". | Ontology |
| Modified objectivist:<br>findings probably true. | Epistemology |
| Case studies/convergent interviewing:<br>interpretation of reality by qualitative methods. | Common methodology |

Source: Adapted from Perry, Alazadeh & Riege (1997); Christie et al. (2000)

Realism sees the world in three layers, namely, mechanisms, events and experiences (Christie et al. 2000). Mechanisms are processes that produce events. Events can be observable or not observable patterns under contingent conditions, while direct observation can obtain experiences (Pawson & Tilley, in Sobh & Perry 2006:1200). According to Neuman (in Sobh & Perry 2006:1201) realism research concerns itself with asking the causes for a particular result because the observed findings are mere "outcroppings" of a deeper, unobserved, or unobservable reality. The mechanisms that lead to a particular event and experience in this study are referred to as drivers that lead to effective environmental management. The observed findings, such as environmental awards from award-winning military units, are just the visible manifestation concerning what drives environmental

management. To fully know the drivers of effective environmental management in award-winning military units, the understanding of a deeper reality (unobserved or unobservable) is necessary. Thus, the realism paradigm was considered suitable for the current study since the researcher is concerned with identifying the drivers that are operating in award-winning units and the ways these drivers interact to create effective environmental management. Yin (1994) explained that if the research is mainly focused on "what" questions, such as in this study, it may call for an exploratory study. Thus, the current study was exploratory. Section 3.2 discusses the research designs adopted to investigate the drivers of effective environmental management.

## 3.2 RESEARCH DESIGN

Babbie (2004) asserts that the research design provides a plan that the researcher intends to follow when conducting the research, while Kruger (2013) describes a research design as explaining how and where data are to be collected and analysed. The importance of identifying in advance how and where data are going to be collected cannot be overemphasised. Mouton (2001) highlights that a thoroughly planned and executed research design maximises the validity of the findings. Available research designs are experiments, surveys, qualitative design, unobtrusive research, participatory action research and evaluation research (Babbie & Mouton 2008). Given the diversity of research designs, it becomes essential that the researcher chooses the most suitable design and, ideally, the choice should depend on the nature of the phenomenon being studied (Bhattacherjee 2012). Table 3.3 shows the research designs applied in this study and their descriptions.

Table 3.3: Research designs and brief description

| **Research design** | **Description** |
|---|---|
| Unobtrusive research | Unobtrusive research designs involve the analysis of physical traces, the use of the internet, content analysis of existing statistics, historical/comparative analysis. Each of these studies allows the researcher to study social life in an unobtrusive manner and non-reactive manner. All methods in this research design do not establish a direct relationship or interaction with the research subject. |
| Qualitative design | The primary goal of studies using this approach is defined as describing and understanding rather than explaining human behaviour. Qualitative designs use direct observation of the social phenomena in a natural setting. It examines the nature of what is described as qualitative research, as well as objectivity, validity and reliability in qualitative research. Three studies that are usually conducted under the umbrella of quantitative analysis are ethnographic studies, case studies and life histories. |

Source: Adapted from Babbie & Mouton (2008:205)

Since the current research sought to identify the drivers of effective environmental management prevalent in the selected military units, an unobtrusive research design and qualitative research design were found to be suitable designs for identifying EEM drivers. The unobtrusive research design was chosen because Perry (as cited in Sobh & Perry 2006) states that, for realism researchers, there is an external reality and other people have usually researched or experienced aspects of that reality before. Thus, their perceptions are some of the many "windows" through which one could view aspects of this reality before data collection commences. Moreover, a preliminary conceptual framework about the research topic was developed from an existing body of knowledge before collecting data. This framework was used to formulate a semi-structured interview schedule.

Qualitative research designs entail qualitative interviews used for the collection of primary data to accomplish the aim of the study. This is more relevant in realism research, more so because prior empirical research or literature can be viewed as additional evidence, used to clarify the imperfectly apprehensible external reality by triangulating on that reality (Riege 2003). It is important to remember that triangulation provides a "family of answers" that covers its reality's several contingent contexts, to capture a single, external, and complex reality. For example, different interviewees are asked the same question to test whether they answer through the same or similar perceptions. Sometimes, these different triangulation sources will provide different perceptions, but those different perceptions should not be considered to be confusing glimpses of the same reality. Instead, they should be considered to foster understanding of the reasons for the complexities of that reality (Pawson & Tilley 1997).

## 3.3 RESEARCH METHODS

Research methods involve the ways data is collected, analysed and interpreted by researchers for use in their studies (Creswell 2009). According to Denscombe (2013), there are four primary methods social researchers can use: questionnaires, interviews, observations and document surveys. It is important to note that each method provides a tool for the collection of empirical data. The instrument provided for each technique helps the researcher to measure the phenomenon under study accurately, as well as gathering facts and evidence about the event under investigation (Cohen 2006). The current study used two of these methods, namely document surveys (EIPs) and semi-structured interviews.

There are two EIPs – promulgated in 2001 and 2008 respectively – currently in use (South Africa 2008). These two documents were analysed using content analysis to verify drivers or mechanisms that the DoD is implementing to deal with environmental issues. Thereafter, a semi-structured interview schedule was developed for collecting primary data from the environmental managers of the selected units. The collected data included the following: biographical information; training history; military experience; ecological experience; knowledge on environmental issues; environmental skills; involvement in military environmental management; and the environmental approach followed in the unit, to name a few.

## 3.4 QUALITATIVE SEMI- STRUCTURED INTERVIEW

The semi-structured interview is one of the techniques in the interview method (Silverman 2013). This technique is more flexible than standardised methods, such as the structured interview (Santos-Reyes & Lawlor-Wright 2001). The researcher in this study had some established general topics for investigation sourced from literature and the EIPs. Semi-structured interviews allowed for the exploration of emergent themes and ideas rather than relying only on concepts and questions defined in advance. The semi-structured interviews were able to provide data on how respondents understand events and experiences. Moreover, the interviews provided the required level of depth and complexity that is hardly available through other approaches. The researcher formulated impromptu questions to follow up leads that emerged during the interviews. By doing so, an opportunity was created for obtaining valuable information that was not foreseen. This flexibility made it possible to construct follow-up questions to match the uniqueness that each participant brought to the study.

### 3.4.1 Development of the interview schedule

The interview schedule for this thesis was semi-structured. According to Rapley (2007) a semi-structured interview usually has a fixed set of questions and subject areas ready before the meeting is carried out. Creating the interview schedule was a process of discovery. The researcher acquired up-to-date information on military environmental management, which was obtained through reading the EIPs and other relevant literature. The researcher also attended seminars/conferences on environmental management to improve his understanding of environmental management processes, current trends and emerging trends. The development of the interview schedule was based on the four main topics identified as central and necessary to answer the research question. After that, a first draft of the interview schedule was submitted to the supervisors (see appendix A).

The researcher then received criticisms and guidelines for improvement. A revised second draft was prepared and piloted with four geography honours students and one environmental officer who was not part of the actual study. These participants gave feedback regarding the draft interview schedule and regarding the interviewer (see Appendix B). Based on the pilot outcome, the draft was improved by incorporating their inputs.

During a third round in the development of the interview schedule it was subjected to scrutiny by a focus group at the Military Academy. This focus group consisted of Military Geography lecturers, senior researchers from other departments and SAS Saldanha environmental officers. The purpose of this focus group was to gauge the validity, straightforwardness and reliability of the semi-structured interview schedule. The members of the focus group were selected for their perceived EM knowledge, availability and relevance. Based on the feedback from this workshop, themes and questions were finalised. The interview schedule contained follow-up questions. The researcher remained open to unanticipated statements. The final interview schedule was used to collect in-depth information about the research topic (see Appendix C).

### 3.4.2 Appropriate number of interviews

Deciding on a sufficient number of interviews is a challenge that often confronts the qualitative researcher. The response to this challenge is never straightforward as there are several variables to be considered. Rowley (2012) believes that the response to this challenge is influenced by the theoretical or practical approach. A brief description of these approaches is contained in Table 3.4.

Table 3.4 Approaches influencing the number of interviews

| S/No | Approaches | Descriptions |
|---|---|---|
| 1 | Theoretical Approach | Length of the interview schedule and number of interviews<br>Nature of research question<br>Research strategy/design |
| 2 | Pragmatic Approach | Duration of the interview session<br>Available participants |

Source: Adapted from Rowley (2012:263)

To demonstrate the complexity of deciding on the number of suitable interviews, Rowley's guideline does not provide a specific answer and only addresses the question from a pragmatic approach (Rowley 2012).

Rowley (2012:263) further states that "new researchers must aim for around twelve interviews of approximately thirty minutes in length or alternatively six to eight interviews of around sixty minutes".

Rowley (2012) further highlights that the number of interviews is not that significant as long as the interviewer ensures that the interviews generate sufficient data. Morse (2000) believes that saturation of data is a more significant factor that should schedule the number of interviews, and not the number itself. Some other factors should be considered in deciding the number of interviews. These factors are listed in Table 3.5.

Table 3.5 Factors for estimating the number of interviews

| S/No | Factors |
|---|---|
| 1 | The scope of the study |
| 2 | Nature of the topic |
| 3 | Quality of data |
| 4 | Study design |
| 5 | Use of shadowed data |

Roller & Lavrakas (2015) state that the appropriate number of interviews to be conducted for a face-to-face interview study needs to be considered at two critical moments in the research process, viz. the initial research design phase and the phase of field execution. At the initial design stage, the number of interviews is dictated by four considerations: (1) the breadth, depth, and nature of the research topic or issue; (2) the homogeneity of the population of interest; (3) the level of analysis and interpretation required to meet research objectives; and (4) practical parameters such as the availability and access to interviewees, travel and other logistics associated with conducting face-to-face interviews, as well as the budget or financial resources. It appears that there is no set number considered appropriate. This is supported by Mason's study titled "Sample Size and Saturation in PhD Studies Using Qualitative Interviews" (Mason 2010:s.p.). Mason's study identified 560 PhD studies that used qualitative interviews as a method of data collection. The overall range of the number of interviews is from one to 95. Mason believes that saturation should be used as a guiding principle. Mason's guideline is in line with the work published by Morse (2000). Mason (2010) concludes that researchers should understand the concept of saturation and related issues about the research question.

After consideration of all the above factors, the researcher in this study concluded that it was possible to identify people in key positions to provide the required information from all the AWMU in WCR. The researcher asked the RFIMs for information on military environmental awards and read through multiple editions of the official publication of the SANDF, South African Soldier, and discovered the names of the AWMU. Then the BEMs in each AWMU in the WCR were identified as potential participants in the study. These BEMs were responsible for implementation of military environmental management. Hence, the scope of this study and the nature of the topic allowed the researcher to select environmental managers from each of the six AWMU and the two RFIMs in the WCR. This decision is in line with Rowley's work, which states that it is preferable to identify a specialist in a position to understand a situation. Rowley (2012) qualified this statement by saying that managers responsible for implementation are likely to provide more details and insight because of their in-depth understanding of the processes involved.

### 3.4.3 Sampling

Sampling is defined as the process of trying to select a representative section of the population to conduct a study and infer results back to the population (Newman 1991; 1994). The sampling plan serves to select the sample from the population. The sampling plan describes the approach that will be used to select the sample, determine adequate sample size and choose a survey mode (Babbie & Mouton 2002). In the current study, two methods were used for the collection of data. During the collection of data from the documents, there was no sampling involved since both the 2001 and 2008 EIPs were studied and analysed. For selecting the interviewees, sampling was done. According to Levy & Lemeshow (1999), survey designs involve two steps. First, a sampling plan must be developed. The sampling plan for the current study consists of purposive sampling and snowball sampling. Purposive sampling was used to select respondents to interview using the developed semi-structured interview schedule.

In purposive sampling, the sample elements are chosen based on the judgement derived from prior knowledge (Kitchin & Tate 2000). During purposive sampling, the individuals to be interviewed are selected from the quality of response that they are likely to give and the type of information the interviewer requires (Babbie & Mouton 2008). In the current study, purposive sampling was used to select seven environmental managers that were interviewed.

A snowballing technique was used to select two BEMs, as in the case where two base environmental managers were unavailable, to locate the appropriate environmental personnel to interview. The "snowball" is the sample that "emerges through the process of reference from one person to the next" (Denscombe 2013). Levy & Lemeshow (1999) refer to snowball sampling as a referral form of data collection. The snowball technique has also proved to be appropriate for sampling hidden respondents within the targeted population (Félix-Medina & Monjardin 2009). The selection of respondents to participate in the study was based on appropriateness and environmental management responsibility within the selected military units. Therefore, only those individuals who were in a position to provide relevant data to achieve the objectives of the study were identified in the target population. As mentioned in Subsection 3.5.2 these individuals consisted of six environmental managers from AWMU and two RFIMs in the WCR selected to answer the research question based on the AWMU. The two RFIMs were selected on the basis of their being responsible to oversee the implementation of environmental policy in the WCR. The following section briefly discusses the geographical location of selected military units in the Western Cape.

## 3.5 GEOGRAPHICAL LOCATION OF SELECTED MILITARY UNITS IN WCR

The selected military units are spread out in the Western Cape. Figure 3.1 depicts the location of the selected units and the number of units selected per area. From the seven military units selected, two units are from Saldanha Bay, three from City of Cape Town, Oudtshoorn and Bredasdorp each housed one selected military unit to answer the research question mentioned in Section 1.3.

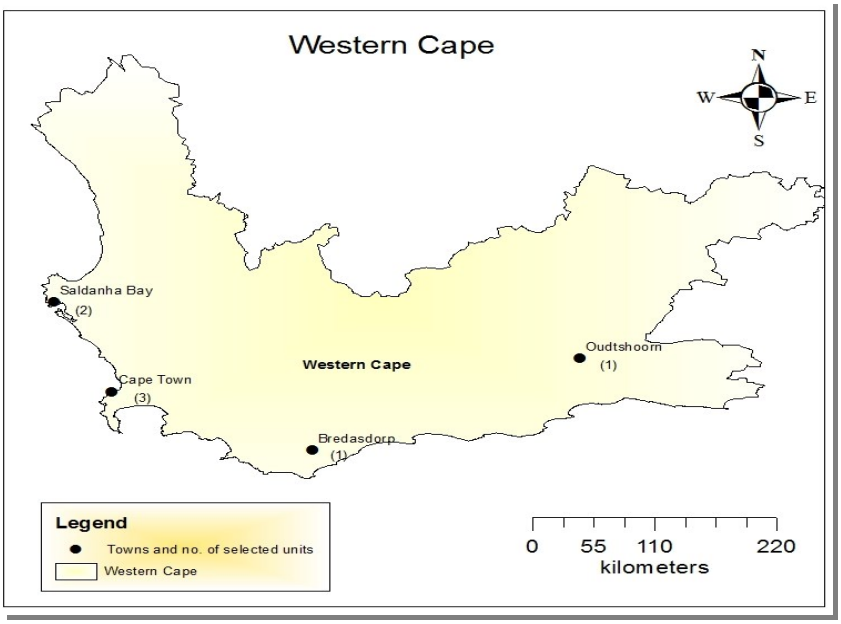



Figure 3.1 Location of the selected military units in the Western Cape

The Western Cape is located on the southern part of South Africa and is bordered by two provinces, the Northern Cape and Eastern Cape. South Africa has nine biomes (Driver et al. 2011). These biomes are Albany Thicket, Desert, Forest, Fynbos, Grassland, Indian Ocean Coastal Belt, Nama-Karoo, Savanna and Succulent Karoo (Driver et al. 2011). The Western Cape is predominately situated within the Fynbos biome and contains approximately 75% of South Africa's rare and threatened plants (Rutherford, Mucina & Powrie 2006). Thus, the Western Cape has the highest concentration of endemic species and it is vulnerable to anthropogenic threats and climate change (Olivier, Myakayaka & Richards 2009 in Smit 2017). Based on the sensitivity of flora and fauna in biomes such as Fynbos and the potential of military activities to damage the environment, effective protection of the environment is necessary to prevent irreparable damage. The process followed during the semi-structured interviews is discussed in the following section.

## 3.6 PROCESS OF CONDUCTING THE INTERVIEWS

The interviews were carried out between 12 December 2016 and 22 June 2017 and carried out face to face. The language used was English, the thread language of the DoD. According to Espeland (2010), face to face interviews are the most common approach for conducting interviews. For this study, the interview surroundings were not identical throughout the nine meetings. One interview was conducted face to face in the office of the researcher, while four interviews were done similarly but held in the participants' offices. The last four interviews were conducted during one of the quarterly meetings of the Western Cape environmental forums, where the researcher interviewed the members one by one until all four members were interviewed. These interviews were done in one day because all members of the military units who met the set criteria were gathered all at once at a quarterly meeting, which helped concerning time, money and convenience for both researcher and participants. During the transcription stage, the researcher was able to gather the necessary clarification from concerned participants and units. In cases of initially selected environmental managers being unavailable, the assistant environmental managers provided answers. Allowing respondents to be in familiar surroundings during meetings made them feel relaxed and comfortable. Espeland (2010) highlights that one of the fundamental objectives of an interview is to create an atmosphere of trust, which enables interviewees to relax and share information about a pursued topic. When conducting the interviews, the researcher stayed mainly within the pre-developed categories and questions of the interview schedule. However, when the respondents mentioned unclear or vague topics, the researcher requested clarification.

In that way, the necessary explanation of questions was provided by the respondents themselves. Kvale (1996) stresses that the semi-structured interview does not need to stick to the interview schedule at all times, but can be altered during the meeting to follow the respondent's story. If an interviewee starts on an interesting digression, the interviewer is free to put forward follow-up questions as he or she sees fit, before returning to the interview schedule. Kvale & Brinkmann (2008) emphasise the importance of letting the interview be reasonably open to acquire valuable information that the researcher had not thought of in advance. This research study also adopted a cross-sectional time horizon, whereby the data was collected and analysed over a particular – and short – window in time. Each meeting lasted from 40 to 80 minutes.

The researcher obtained prior verbal permission from each participant to record the entire interview. Thus, the conversations were recorded using a tablet galaxy smartphone, while notes were taken using a pen and notebook. Participants were informed of the purpose of these recordings, their safe-keeping and how information would be treated and managed.

## 3.7 DATA ANALYSIS AND INTERPRETATION

Realism research is about underlying structures and mechanisms; the data are almost always qualitative (Sobh & Perry 2006). Dey (1993) states that the primary purpose of the analysis is to make sense of the acquired data. Babbie (2004) remarks that trustworthy human beings are the instruments through which the world is studied (Bless, Higson-Smith & Sithole 2013). According to Bless, Higson-Smith & Sithole (2013), the concept of trustworthiness in qualitative research evaluates the quality of the research based on four concepts: credibility, dependability, transferability and conformability. Credibility refers to the concept of internal validity, and it proves that the outcome of the research depicts the truth (making sense) of the reality under investigation – in other words, the researcher must be able to substantiate the choice of the design, methodology and methods (Bless, Higson-Smith & Sithole 2013). Credibility deals with the question: How congruent are the findings with reality? (Shenton 2004). Espeland (2010) explains how the criterion of credibility in a qualitative study is concerned with the trustworthiness of a study. Trustworthiness can be strengthened if the researcher distinguishes between information expressed in the research field and the researcher's evaluation of it. To obtain data free from assumptions, all the recorded interviews were transcribed word for word and notes were taken during interviews.

Through the inclusion of direct quotes in research results, after conducting the analysis, a clear distinction is made between respondents' statements and the researcher's interpretation of them. The researcher's interpretations are presented as reflections or comments on the quotes and retellings, but are not detached from them. Direct quotes have been used within a thematic context as near-verbatim as possible to the contributions made by participants in interviews. However, the included quotes have been selected and may therefore subjectively influence the results. Not all respondents are quoted on every topic, and on several occasions when interviewees mentioned the same concerns they are cited as "all". It is important to stress that consensus among the respondents is not an issue here. All respondents had the opportunity to speak freely within the parameters of the interview schedule. Participants were given opportunities to refuse to participate in the project to ensure that the data collection sessions involved only those who were genuinely willing to take part and prepared to offer data freely. Participants were also encouraged to relax from the onset of each session, with the researcher aiming to establish collegial and friendly rapport in the opening moments and indicating that there were no right or wrong answers to the questions asked. Participants were informed in advance that they were granted full anonymity. Respondents were also informed that they could withdraw from the interview at any time. According to Bless, Higson-Smith & Sithole (2013), "dependability" as a concept is similar but not the same as reliability. Shenton (2004) believes that to address the dependability issue, the processes within the study should be reported in detail, thereby enabling a future researcher to repeat the work, if not necessarily to gain the same results. Thus, the research design may be viewed as a "prototype model". Such in-depth coverage also allows the reader to assess the extent to which proper research practices have been followed.

The concept of conformability is the qualitative investigator's equal concern to objectivity. Here steps must be taken to help ensure as far as possible that the work's findings are the result of the experiences and ideas of the informants, rather than the characteristics and preferences of the researcher. The concept of conformability denotes to what extent researchers can be critical of their interpretations and support from the findings of other researchers. Several strategies are available for improving this concept. For instance, one could document every procedure to monitor the data (Trochim & Donnelly 2001). Consequently, the theoretical framework of this research seeks to provide reliable and detailed information about central perspectives related to the research question. Additionally, the method section focuses on systematic interpretations, especially regarding openness related to choices of process, method and conduct. Detailed monitoring of these aspects

would strengthen the study's conformability (Trochim & Donnelly 2001). Espeland (2010) emphasises how the criterion of transferability refers to the interpretations developed within the frames of a given research project and how these may be relevant in another setting. A researcher has to ask, to what extent does results provide any meaning beyond the given circumstances. Whether the participants of this study provide any general information on the subject matter, beyond what is true for them, is up for debate.

Transferability can be compared to the external validity that is concerned with the extent to which the findings of one study can be applied to other situations (Bless, Higson-Smith & Sithole 2013). Since the results of a qualitative project are specific to a small number of particular environments and individuals, it is not easy to demonstrate that the findings and conclusions apply to other situations and populations (Shenton 2004). However, the researcher should provide a detailed description of the context in which the data was collected, about the researcher as a person, and about the relationship with the participants. When the context from which the findings emerge from and several other settings can be imagined where such outcomes might be meaningful, a study can be referred to as having high transferability.

## 3.8 ETHICAL APPROVAL AND AUTHORITY TO CONDUCT THE STUDY

When researchers have to interact with participants, Kruger (2013) asserts that researchers should always remember that while they are doing their research they are entering the private spaces of their participants. Entering the private spaces of their participants raises ethical issues that were addressed before, during and after the study has been conducted. Creswell (2009) states that the researcher should respect the rights, needs, values and desires of the participants. The process of obtaining authorisation for the study started with the drafting of a letter to solicit permission to conduct the interviews in the military units in the Western Cape. This letter was then submitted to the WCR RFIMs, and authority to carry on with the study was granted (see Appendix D).

Following approval to carry on with the study, the application for ethical clearance was completed and submitted and approved by the ethics subcommittee at institutional level (see Appendix E). Regarding participants, the informed consent forms which contained detailed information about the study was given to the participant to read and understand (see Appendix F). The informed consent form also considered factors such as possible harm and risk to the participants; honesty and truthfulness of the researcher; privacy, confidentiality and anonymity through which the researcher

ensured the following: that collated responses could not be linked to individual respondents; participation of the participants was voluntary; options to withdraw if uncomfortable during the interviews was guaranteed; purpose of the research was properly explained. Table 3.6 shows the issues that the researcher considered when conducting research that involve people as the unit of analysis.

Table 3.6: Issues to be considered when doing research

| | |
|---|---|
| Informed consent | Do participants have full knowledge of what is involved?<br>Yes – Informed Consent Form with interview schedule. |
| Harm and risk | Can the study hurt participants? No. |
| Honesty and trust | Is the researcher truthful in presenting data? Yes. |
| Privacy, confidentiality and anonymity | After the researcher had collated responses, it will not be possible to identify individual respondents. Yes. |
| Intervention and advocacy | What should researchers do if participants display harmful or illegal behaviour? Withdraw them and replace them. |
| Voluntary participation | Has it been made clear that the participation is voluntary?<br>Yes – Informed Consent Form |
| Purpose of research | Was the purpose of research made clear to the participants?<br>Yes – Introductory page |
| Authority | Military Academy Research Ethics Screening Committee |

The research participants signed the consent form after reading it. This was important because research subjects may not be coerced to participate in the research, especially considering research would be conducted among both senior and junior rank carrying participants. All research-related documents had to be stored safely. This chapter has outlined the methodology, research design, methods, data analysis and ethical clearance that were followed to achieve the objectives of this research. In Chapter 4 the results and findings of the semi-structured interviews with environmental managers from the units that have won the environmental award in the past five years preceding 2016 is presented.

# CHAPTER 4: ENVIRONMENTAL MANAGERS, AWARDS AND POLICIES

Semi-structured interviews were conducted with environmental managers from all the award-winning units with the aim of identifying drivers of environmental management. This chapter reports the findings of the study in which both semi-structured interviews and a desktop study were used to gather data. The chapter commences with the results and a discussion of the service information of the participants. This is followed by a general description of the environmental awards won by the selected military units. The chapter concludes with an analysis of drivers of environmental policies, plans and programmes as drivers of environmental management.

## 4.1 SERVICE INFORMATION OF PARTICIPANTS IN AWARD-WINNING UNITS

Section 4.1 provides the service information of participants. This information was asked for in the introduction of the interview schedule. First, arms of service, military unit, rank, military service and time in current post and environmental experience are stated. Second, post responsibility and level of education completed are discussed. Functional and environmental courses completed by the participants are also discussed.

### 4.1.1 Arms of service, military unit, rank, military service and time in current post and environmental experience

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A total of nine environmental managers participated in the study. The participants consisted of two groups, namely Regional Facilities Interface Managers (RFIMs) and Base Environmental Managers (BEMs, the majority being BEMs (78%). The RFIMs make up the lowest proportion, equivalent to 22%. The award-winning military units (AWMU) are from three arms of service, namely the South African Air Force (SAAF), SA Navy (SAN) and SA Army (Army). The SAAF units (AFB Langebaanweg, AFB Ysterplaat and AFB Overberg) make up the highest proportion (50%), followed by the SAN units (SANAD and SAS Saldanha) and SA Army (Infantry School) with 33% and 17% respectively. The majority of participants are officers (45%) with a rank of captain to lieutenant colonel, followed by warrant officers (33%). Non-commissioned officers (NCO) (CPO/FSgt), all female, make up the lowest proportion (22%). The term of military service of the participants ranged between 18 and 40 years, with an average of 25.4 years, indicating long military service. However, more than half (67%) of the participants have a term of service of between 18 to 24 years. Only 22 % of participants recoded service of 20 years or less. Figure 4.1 illustrates that the years of service, 26 to 30, 31 to 35 and 36 to 40 are equally proportioned at 11%.

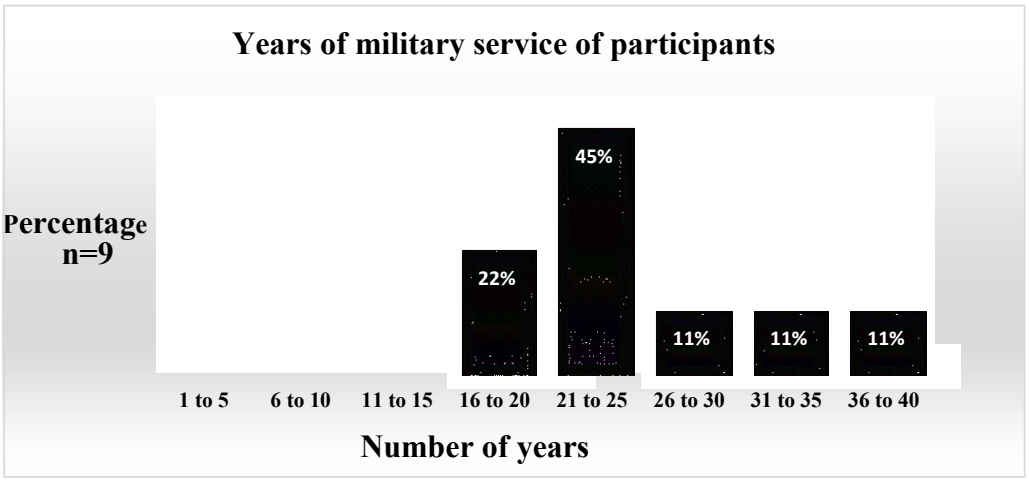


Figure 4.1: Years of military service of participants

The time in current post ranged between 6 and 20 years, with an average of 13.8 years. Figure 4.2 depicts that only 22% of the participants are more than 20 years in their current post, followed by 11% indicating that they have been more than 15 years but less than 21 years in their current post; 45% of the environmental managers have been in their current post for more than 10 years, while only 22% have been in their current post less than 11 years but more than 5 years.

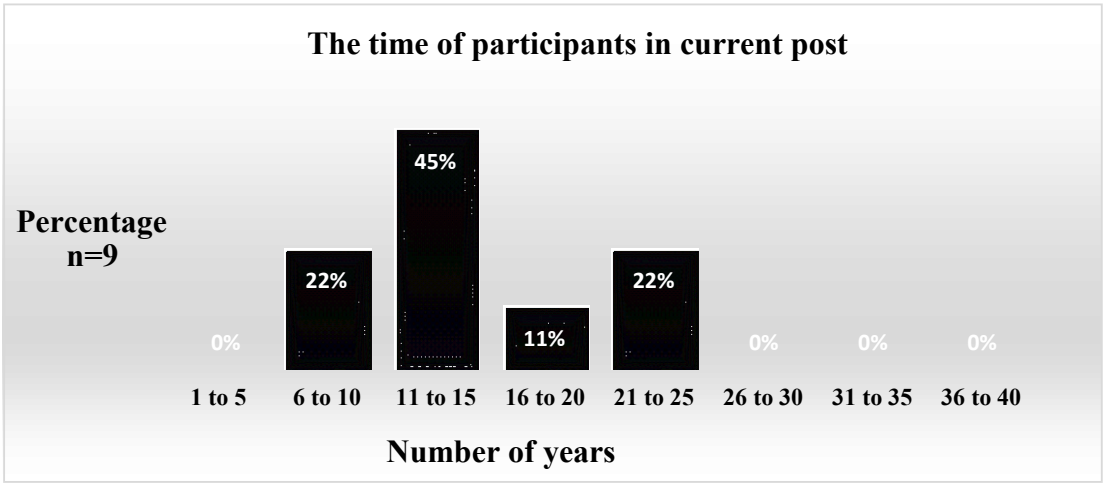


Figure 4.2: The time of participants in current post

The environmental management experience of participants ranged between 10 and 22 years, while their average environmental management experience is 16.1 years. The majority (45%) have 11 to 15 years of environmental management experience, followed by the 33% who have 21 to 25 years. Those with 6 to 10 years and 16 to 20 years make up the lowest proportion, of 11% each, as indicated in Figure 4.3.

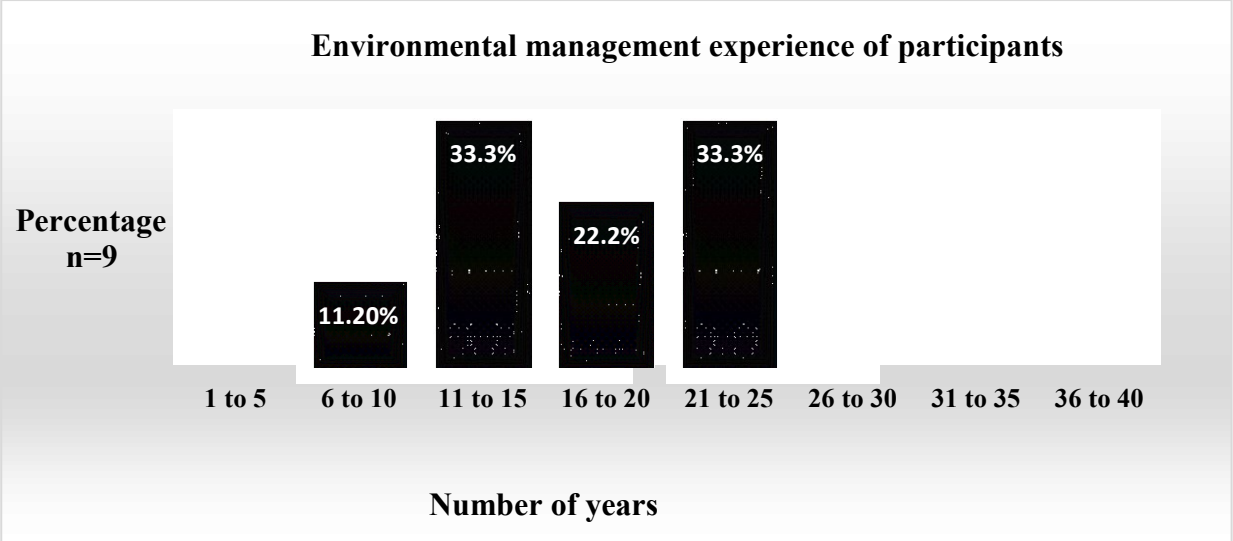


Figure 4.3: Environmental management experience of participants

### 4.1.2 Post responsibility and level of education

The post responsibility of environmental managers includes environmental management implementation and advising the Officer Commanding (OC). The responsibilities of RFIMs include co-ordinating and overseeing the implementation of environmental management (EM), as well as the development of strategies for environmental management in the Western Cape Region (WCR), as shown in Table 4.1

Table 4.1: Post responsibility of RFIMs and BEMs

| Participant | Post responsibilities |
|---|---|
| RFIMs | Oversee and co-ordinate environmental implementation and performance.<br>Develop strategies of environmental management. |

| | |
|---|---|
| BEMs | Environmental management implementation.<br>Advising the Officer Commanding on environmental impact issues / concerns. |

Figure 4.4 illustrate that 33.2% of the participants have an NQF 4 qualification. A similar percentage (33.2%) has NQF 6. Only 11.2% have NQF 5, 8, and 9 qualifications.

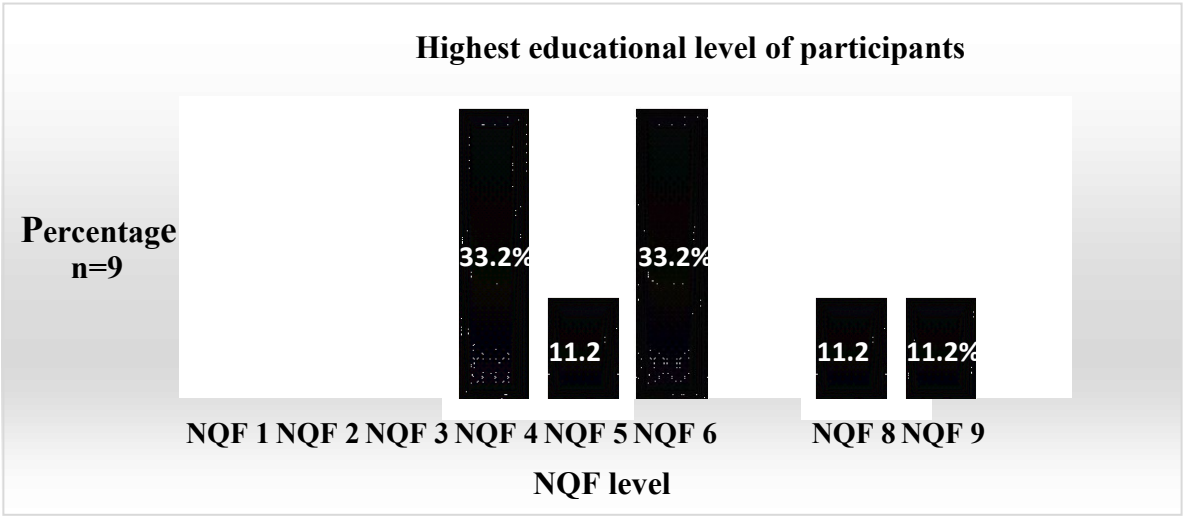


Figure 4.4: Highest educational level of participants

### 4.1.3 Functional and environmental courses completed

Figure 4.5 shows that all participants have completed the field EM and environmental auditing course. The majority (89%) have done MIEM and Rehabilitation of Disturbed Areas, while 78% completed ISO 14001 management system courses. Only 67% completed courses in Snake Handling, Bird Identification, Environmental Law, and Sustainability to EM Principle.

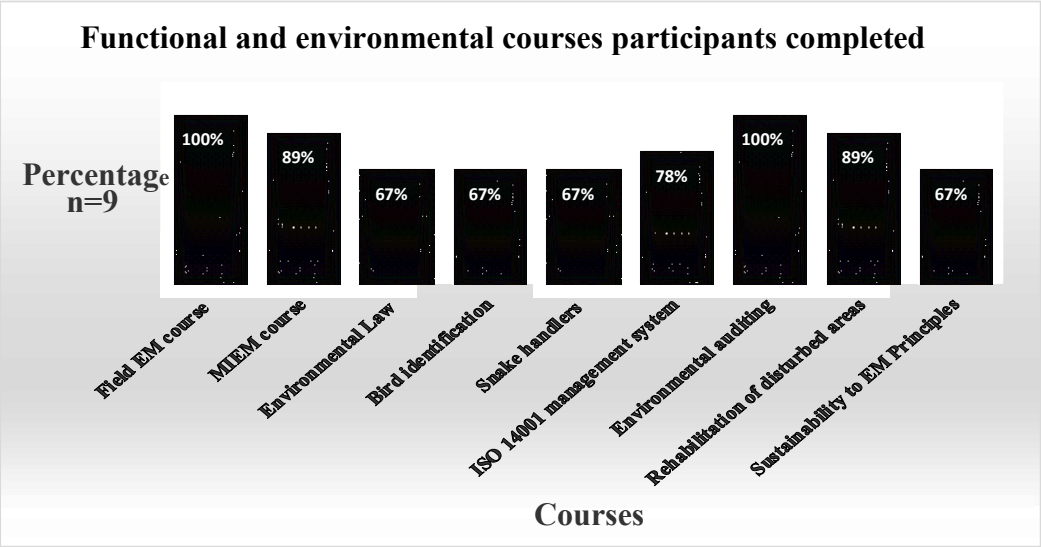


Figure 4.5: Functional and environmental courses participants completed

Figure 4.6 illustrates that the average time in current post for the participants with 16 to 20 years of military service is 9 years, while they have an environmental experience of 11 years. For those with 21 to 25 years of service, the average time in post is 15 years, while their experience is 18 years; 26 to 30 years with an average of 22 years in both time and experience; 31 to 35 years average 19 years and 22 years respectively; and 36 to 40 years average 15 years for time in current post and environmental experience.

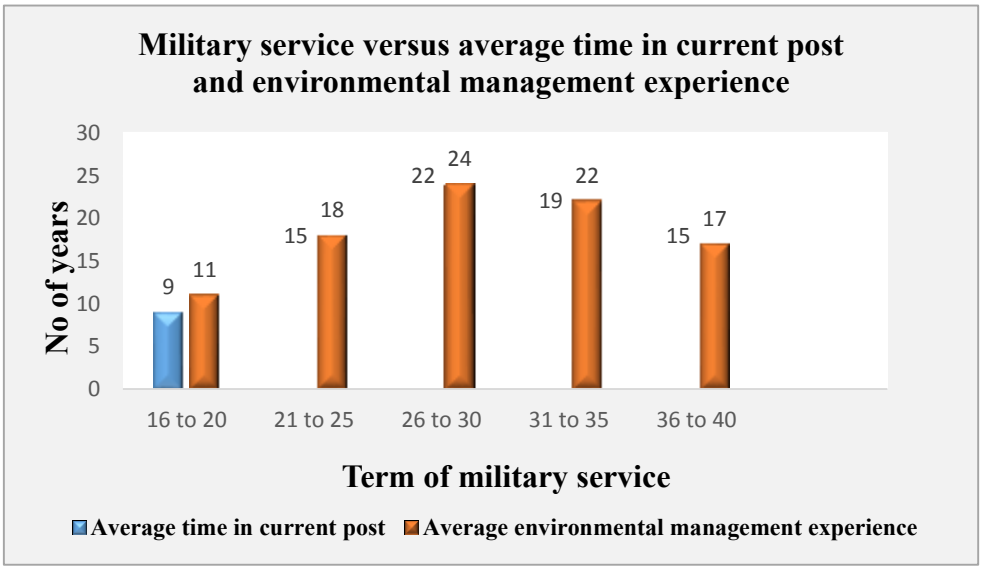


Figure 4.6: Military service versus the average time in current post and environmental management experience

## 4.2 DISCUSSION OF FINDINGS ON SERVICE INFORMATION

From the presentation of results a number of issues with regards to arms of service, military unit and profile of RFIMs and BEMs emerged. This section begins with a discussion of arms of service and military units, followed by a profile of RFIMs and BEMs.

### 4.2.1 Arms of service and military units

The SANDF has four arms of service, namely SA Army, SAAF, SA Navy and Military Health Services. All have equal responsibility of stewardship towards the environment (South Africa 2008). However, the service information of RFIMs and BEMs revealed that the AWMU in the WCR hail from three arms of service.

These arms of service are shown in Subsection 4.1.1 and Table 4.2 exhibits that the SAAF has more units that have won the annual environmental awards (AEA) since inception of the awards, followed by the Navy and Army units respectively. The findings in this regard are similar to the results of a related study conducted by Ramos and De Melo (2005), titled: "Environmental management practices in the defence sector: Assessment of the Portuguese military's environmental profile." Ramos and De Melo (2005) concluded in their study that there are many driving factors that improve environmental performance of military units. Empirical research has shown that the

Air Force, Navy and Army can indeed be studied as a unit when it comes to environmental management practices (Ramos & De Melo 2005:1121). Thus, there are drivers that make the military units listed in subsection 4.1.1 achieve good environmental performance and win AEAs. These drivers may include a number of factors which are discussed later. For now, the focus shifts to the profile of environmental managers.

### 4.2.2 Rank, military service, time in current post and environmental experience

The semi-structured interviews revealed that BEMs are appointed from three rank categories. Smit (2017) points out that among the rank categories, there is a gap in terms of environmental attitude and knowledge between junior ranks, such as rifleman, and more senior ranks, but not necessarily in terms of behaviour. This is the case because behaviour can be enforced through the command and control structure of the SANDF as Smit (2017:187) alledges that "acting on instruction enforces good environmental practice even in the absence of a corresponding attitude and knowledge."

However in the current study, respondents pointed out that they acquired environmental experience even before being appointed as BEMs and Figure 4.6 depicts this trend. Though participants were in different rank categories, 89% had environmental experience of more than 11 years and only 11% have less than 10 years. Soldiers with environmental experience performed better than those without it (Smit 2017). The average time in current post (environmental post) for the respondents is nine years or more. This is clear from Figure 4.6, where average time in current post and average environmental experience are illustrated. The environmental managers are generally appointed into the role of EM within their first five years in their respective military careers. The early appointment into the role of environmental management allows BEMs to build up environmental management experience. The environmental managers in the AWMU and RFIM office in the WCR are from three different rank categories and consist of both males (78%) and females (22%).
They generally have military service of more than 15 years, and environmental experience of more than 11 years. They have been functioning in the role of EM till late in their military careers, and are thus very experienced.

### 4.2.3 Post responsibility, environmental courses and level of education

Subsection 4.1.1 describes the distribution of environmental managers. Environmental managers consist of BEMs at unit level and RFIMs at regional level and have different responsibilities. Table 4.1 shows those responsibilities. The RFIMs are senior Army officers. They have been in their

current (environmental) posts for more than 15 years and are occupationally / officially based in Cape Town; the BEMs are staffed in AWMU in the WCR. Both RFIMs and BEMs accept the responsibilty of stewardship for the environment (Participant I). Figure 4.5 illustrate some of the courses that environmental managers must complete. Some of the courses have already been completed by some BEMs, but some BEMs still have environmental courses outstanding. This indicates that environmental managers continuously empower themselves with environmental education.

The appointment of BEMs in the early stages of their careers has some benefits, such as more time for them to complete or undergo environmental training and education (Participant H). This allows appointed individuals an opportunity to develop environmental related skills, knowledge, attitudes and pro-environmental behaviour (Participant I). Furthermore, this means that there is also sufficient time for them to acquire relevant environmental knowledge and to improve their EM capacity. Johannessen & Olsen (2003) highlight that knowledge and skills are strategic inputs for any organisation and are likely to lead to sustainable EM practices. In addition, environmental managers value training and education. Figure 4.4 depicts that at most 66% of them have post-matric qualifications. Some are currently studying in higher education institutions towards environment-related qualification (Participant D).

These environment-related courses do improve not only their environmental knowledge, but also their associated attitude and behaviour towards the environment. Empirical evidence proves that environmental specific courses could develop the attitudes of participants for the benefit of environmental management in the DoD (Huang & Shih 2009; Smit 2017). Environmental management in all arms of service is informed by the same policies and plans (South Africa 2008), yet these arms of service display varied levels of EEM.

The prescribed processes and procedures are the same. The focus of the study is what drives them to either effectively improve in their particular settings, as they are all affiliated to the same organisation. People with environmental knowledge process EM information to understand how to deal with potential environmental problems. They thus accept stewardship for the environment and understand the mutual benefits of responsible and effective environmental actions (Frick, Kaiser & Wilson 2004). This observation suggests that BEMs with environmental experience (reflected in Figure 4.3) and a fitting / an appropriate level of education (reflected in Figure 4.4), who continue to attend military environmental courses to enhance their knowledge and skills are capable of achieving effective environmental management in their respective military units. Environmental

managers in the AWMU and RFIM offices value training and education as they are continuously learning.

## 4.3 WINNERS OF ANNUAL ENVIRONMENTAL AWARDS IN THE WCR BETWEEN 2011 AND 2015

The military units in the WCR have been winning most of the annual environmental awards. Thus, this section presents categories and winners of environmental awards from 2011 to 2015 in the WCR. The statistics of annual environmental awards won by units in the WCR concludes the section.

### 4.3.1 Categories and winners of environmental awards

The winners of environmental awards in the WCR during the period for which the research focused (2011 to 2015) were AFB Langebaanweg, AFB Overberg, AFB Ysterplaat, SAS Saldanha, South African Naval Armament Depot (SANAD) and Infantry School. Table 4.2 illustrates different categories of annual environmental awards (AEA), the winners of awards and the year/s when awards were won over the period 2011 to 2015.

Table 4.2 Environmental awards and winners from 2011 to 2015

| S/No | Categories | Winners | Year |
|---|---|---|---|
| 1 | Rand Water Award | AFB Langebaanweg | 2011, 2012, 2013, 2014, 2015 |
| 2 | National Energy Award | AFB Langebaanweg | 2014, 2015 |
| 3 | Keep eThekwini Beautiful Award | AFB Overberg | 2013 |
| | | AFB Ysterplaat | 2015 |
| 4 | Caltex Trophy | AFB Ysterplaat | 2011 |
| | | SANAD | 2014, 2015 |
| 5 | Endangered Wildlife Trust Floating Trophy | AFB Overberg | 2011 |
| | | Infantry School | 2012 |
| | | SAS Saldanha | 2014 |
| 6 | Professor Kristo Pienaar Floating Trophy | AFB Overberg | 2012 |
| | | AFB Langebaanweg | 2013 |

| | | | |
|---|---|---|---|
| | | SANAD | 2014 |
| | | SANAD | 2015 |
| 7 | SanParks Floating Trophy | AFB Overberg | 2011,<br>2012,<br>2013,<br>2014,<br>2015 |

### 4.3.2 Statistics of environmental awards won per year by units in the WCR from 2011 to 2015

The total number of awards won by units in the WCR was 57% of the national total from 2011 to 2013. This number increased to 87% between 2014 and 2015. Table 4.2 depicts that the Rand Water Award for Water Efficiency and the SanParks Floating Trophy for Integrated Environmental Management Systems have been won by a Western Cape military unit every year between 2011 and 2015. This amounts to 100% over the five-year period. The Professor Kristo Pienaar Floating Trophy for Environmental Education and Awareness Training had been won four times, this is equivalent to 80%, by a military unit in the WCR. The Caltex Floating Trophy for Base Environmental Management and the Endangered Wildlife Trust Floating Trophy for Ecological Management had both been won three times, equal to 60% over the five-year period. The National Energy Award for energy efficiency and the Keep eThekwini Beautiful Award for Integrated Waste Management have been won twice each between 2011 and 2015. The last two categories are the least-won categories by the Western Cape military units and amount to 40%. Figure 4.7 shows the total number of AEAs won by units in the WCR. The total number of AEAs won by the WCR amounts to 69% of the national total. It is therefore clear that WCR units dominated the awards by an increasing margin during the period under investigation.

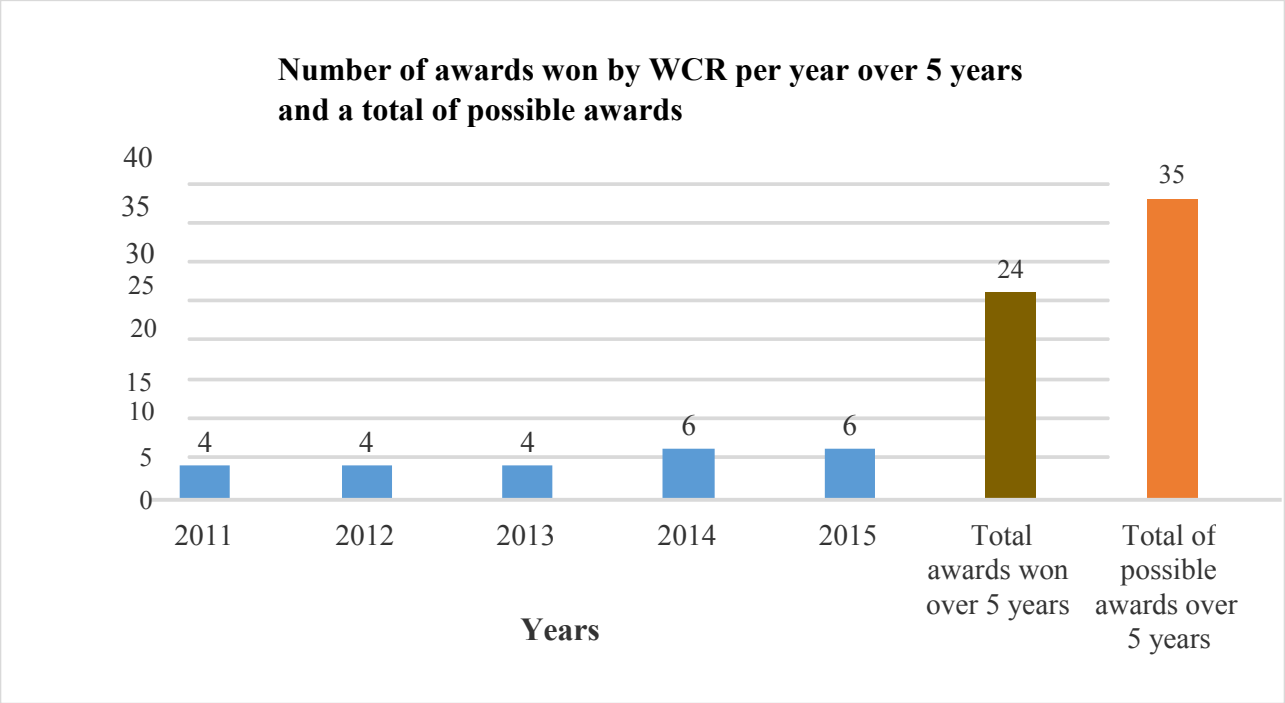


Figure 4.7 Number of awards won by WCR per year over 5 years and a total of possible awards

Figure 4.8 shows the frequency with which the WCR military units have won the specific environmental award. The areas of dominance by the WCR in terms of awards can be clearly seen.

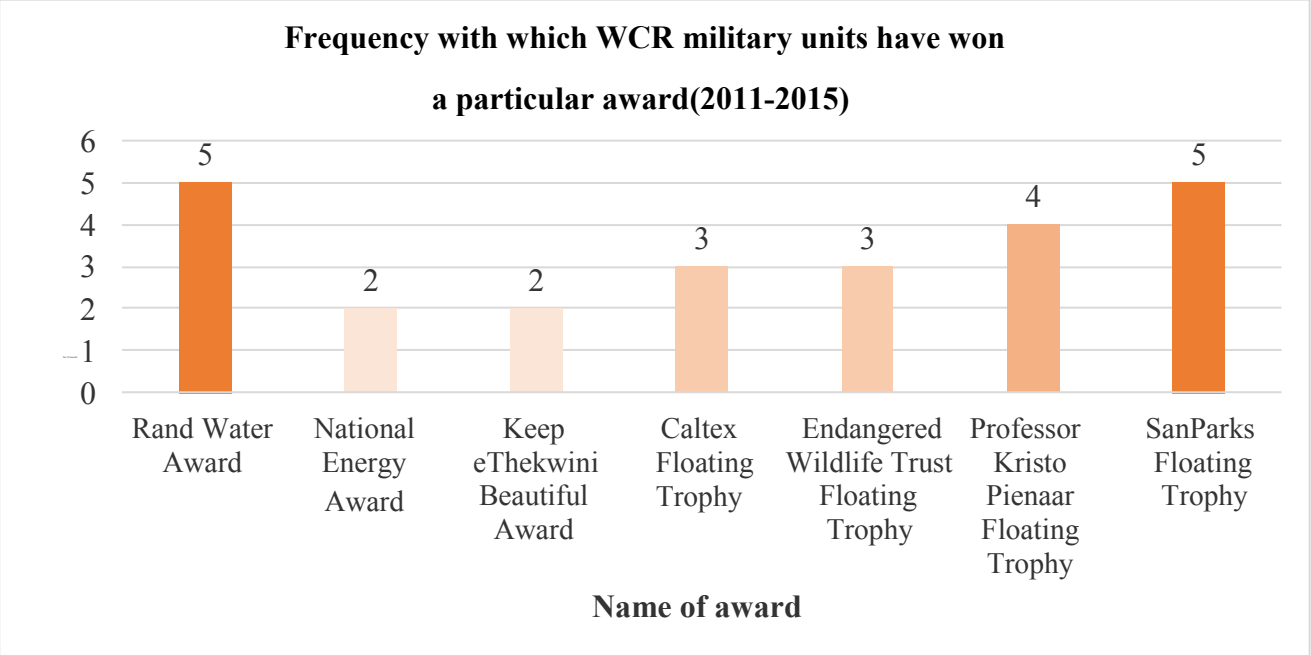


Figure 4.8 Frequency with which WCR military units have won a particular award (2011-2015)

### 4.3.3 Discussion of findings on environmental awards

The SA DoDMV uses the environmental awards listed in Table 4.2 to encourage and reward military units for work well done. These awards motivate the environmental managers to implement environmental management strategies to ensure that they achieve the environmental standards set by the SA DoDMV. Environmental awards are used as a mechanism for monitoring the implementation of EM and for environmental performance (EP) (South Africa 2008; Laubscher 2016, Pers comm). The environmental awards can be seen as a form of recognition, as drivers of environmental management, for they motivate members to meet the set environmental standards.

Furthermore, environmental awards reveal the environmental management areas in which the military units are evaluated. The growing dominance of the WCR military units in winning the specific awards from 2011 to 2015 is illustrated in Figure 4.7 and Figure 4.8. The AEAs provide evidence that the DoD accepts its responsibility of stewardship for the environment under its control and within which it operates. Moreover, it encourages military units to continuously identify and manage environmental impacts on military territory to achieve environmental policy goals, thereby preventing unnecessary expenses, while ensuring the sustainable future utilisation of military land (Letaoana 2006). The six AWMUs in the WCR provide essential insights as they contain the evidence of context and mechanisms that work successfully.

Vesely (2011:99), as mentioned in Chapter 1, states that instead of developing an abstract ideal state, we should develop what either has been implemented or is being implemented and is proven to work elsewhere. Therefore, the selected military units can be considered exemplars. Results from these exemplars could be of benefit to other military units in the SANDF in many ways. The benefits include learning what works, and reinforcing these through training and policy or other means.

A conclusion can be drawn from the results presented above – one that pertains to the first objective. Six military units met the criteria set for this study. The award-winning military units have factors that drive effective environmental management. The AEA programmes help the DoD to demonstrate their commitment towards the environment while meeting the increased governmental and public expectations regarding military environmental management. The 69% success rate of the WCR when it comes to AEA shows that these military units strive to conduct their activities in a sustainable manner.

Each environmental award presents an opportunity for related external expertise from outside the DoD to address environmental issues at the execution level. The expertise is provided by experts from various government departments and non-governmental organisations (NGOs) that have established formal liaison platforms with the DoD through a relevant environmental category (South Africa 2001; 2008). Table 4.3 shows the government departments and NGOs that provide their expertise to the DoD through an environmental awards programme.

Table 4.3 Departments/NGOs providing expertise to the DoD per environmental category

| S/No | Environmental category | Departments providing external expertise to the |
|---|---|---|

| | | DoD in specific environmental categories |
|---|---|---|
| 1 | Water Efficiency | National Department of Public Works<br>Department of Water Affairs and Forestry<br>Rand Water |
| 2 | Energy Efficiency | Department of Minerals and Energy<br>National Energy Regulation of South Africa |
| 3 | Integrated Waste Management | Institute of Waste Management<br>Association of Clean Communities |
| 4 | Base Environmental Management | Department of Environmental Affairs and Tourism |
| 5 | Ecological Management | Endangered Wildlife Trust |
| 6 | Environmental Education and Awareness Training | South African National Biodiversity Institute<br>Department of Basic Education<br>Tertiary institutions |
| 7 | Integrated Environmental Management Systems | Local governments |

These departments provide insight regarding environmental management information. Furthermore, the moderating influence of alliances outside of the department also serves as prominent benchmarking mechanisms (South Africa 2001; 2008). The BEMs benefit much from this process as they sometimes interact and engage the experts on environmental issues during feedback sessions (Participant F).

Feedback sessions indicate the EM strengths, and suggest how the areas of concern should be rectified (Participant B). The unique set of skills and knowledge acquired from the external expertise are imparted to the BEMs. So doing it may contribute to the programme of continual improvement and promote open conversation on military-related environmental issues.

## 4.4 ENVIRONMENTAL POLICIES

Section 4.4 reports the findings of the current research pertaining to environmental policy referred to by participants as the source documents/instructions for implementation of environmental management in their units. First, the environmental policy identified by participants are presented.

Second, the importance of environmental policy is discussed, followed by a discussion of environmental policy training.

### 4.4.1 Environmental policies identified by participants

The SA DoDMV conducts its activities according to environmental policies and documents, such as the Acts listed in Tables 2.2 and 2.3 in Sections 2.3.2 and 2.3.4 respectively. Environmental policies, documents and percentages of environmental managers' responses are illustrated in Figure 4.9.

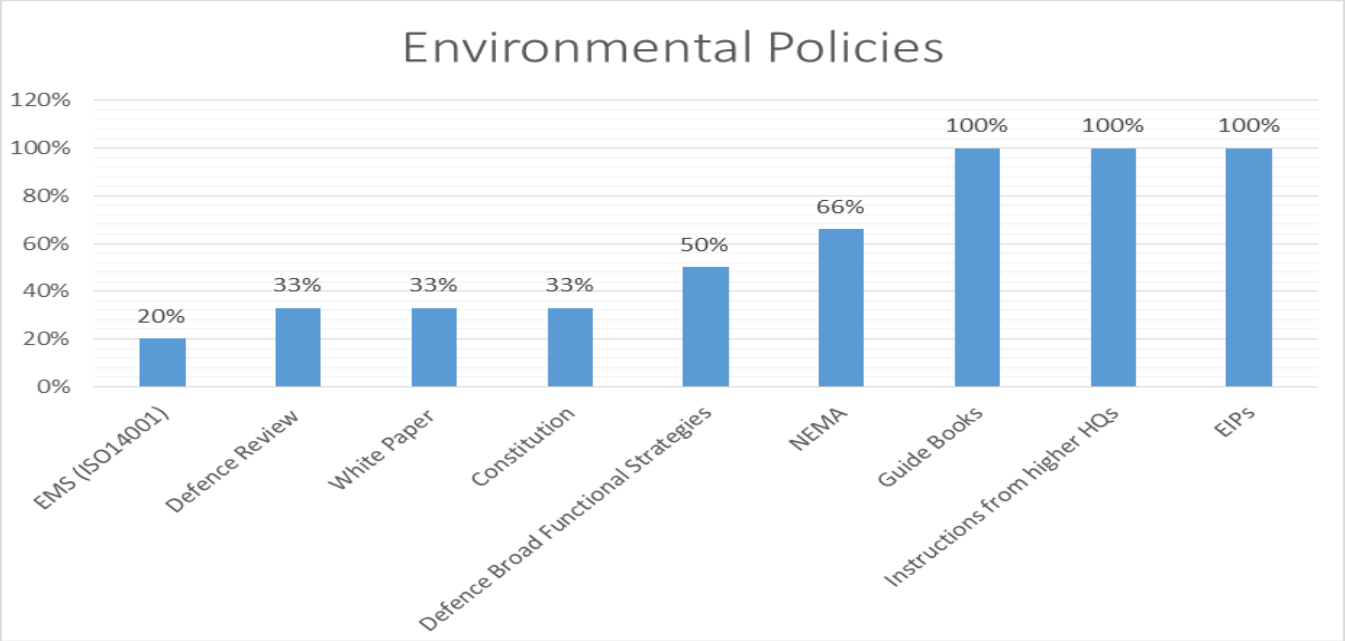


Figure 4.9 Environmental policies

Twenty per cent of the participants mentioned the international standard for EMS (ISO 14001). The results reveal that only a small number of environmental managers are referring to ISO 14001 in their process of implementing environmental management in the military environment. The small

number of environmental managers referring to ISO 14001 may be attributed to the fact that only one military unit in the SANDF is ISO 14001-accredited facility (Smit 2017). A possible further explanation is that the EMS based on ISO 14001 failed in most military units when it was piloted from 2004 to 2007, and it had not been implemented to date (Smit 2017). Though the EMS based on ISO 14001 was never officially rolled out in the DoD, units may still use the piloted version (Participants I). Currently, there is only one military unit in the WCR implementing the piloted version of EMS, namely AFB Overberg (Participants H).

Thirty three per cent of the participants mentioned the Defence Review, the White Paper on Defence and the Constitution as the policies that inform their actions with regard to environmental management. These are national policy documents that do not address the environmental issues in detail, and simply inform Defence policies on the environment (South Africa 2008). This suggests that more than 67% of participants prefer to consult detailed and specific policies. Some 50% of the participants mentioned the Defence Broad Functional Strategies and NEMA respectively. This means that many environmental managers are more familiar with both Defence Broad Strategy and NEMA, than other policies mentioned earlier. The Defence Broad Strategy is the basis for the implementation of environmental services in the DoD, while NEMA makes provision for the EIPs in the SA DoDMV and also impose requirements for, and approaches in dealing with environmental issues (South Africa 2001, 2008).

All participants mentioned guidebooks, instructions from higher HQs and EIPs as the environmental policy documents that inform their actions about environmental management. The results suggest that these are the central policies or instructions as they are informing the actions of participants. Guidebooks, instructions from higher HQs and EIPs are the documents of which every environmental manager needs to be aware, because their implementation will result in reduced environmental impact. They contain details about the action of environmental management towards environmental management and performance in the DoD (South Africa 2001; 2008). Therefore, they represent instruments that integrate and drive environmental responsibility in the DoD (South Africa 2008).

Mechanisms intended to deal with environmental issues on various military bases are contained in the EIPs. These are steps that environmental managers must follow and apply in different military bases in order for the DoD to achieve its commitment to effective environmental management.The responsibility of the DoD towards the environment is consistent with other defence forces

internationally (Ramos & De Melo 2005). Magagula (2014) states that there is a worldwide emphasis on defence forces to regulate the management of the environment within its territory. This is in line with empirical research (Ramos & De Melo 2005; Magagula 2014; Smit 2017) as they also confirmed the existence of organisational environmental policies. Researchers such as Walton, Handfield & Melnyk (1998); Beamon (1999); Zhu, Sarkis & Geng (2005); Walker, Di Sisto & McBain (2008); Paulraj (2011) are of the view that without environmental policy organisations would not necessarily prioritise or exert effort towards environmental issues. Therefore, policy is one of the critical mechanisms that environmental managers are reportedly using (Green Morton & New 1996; Lui et al. 2010).

### 4.4.2 Importance of environmental policies

Environmental managers cited that environmental policies are essential because they are educational, empowering, guiding and a useful decision-making tool as well. According to South Africa (2008), environmental policies are important because they provide a course of action for harmonising military activities with the environment.

All participants concurred that environmental policy is important because it is educational and empowering, while 83% of the participants believed that environmental policies are essential because they control and guide the decision-making of all those involved in environmental management in the DoD. Environmental policies guide the environmental managers in ensuring that land under control of the DoD is used and managed sustainably. The research indicates that environmental managers acknowledge the role of environmental policy in the process of building capacity for effective environmental management. Participants in this study highlighted the importance of environmental policy about environmental management on four levels (Figure 4.10).
Regarding education, the environmental managers' responses reveal that the environmental policies equip them with knowledge of what ought to be done to be environmentally responsible. Policies also contribute to how they view environmental issues (Participants A and C). Participant B highlights that environmental policies provide environmental officers with good environmental standards and offer the scope of environmental related functions.
Participants further testify that environmental managers are empowered to intervene when people are not in line with the environmental instructions at the lowest level (Participant C). Furthermore, policies allow environmental managers to control actions impacting the environment negatively.

They are then able to carry out their environmental responsibility within the boundaries set by the environmental policy.

*"These policies are important because they show us what needs to be done and how to think about a particular matter or how to make decisions."* (Participant C). *"Policies help us to deal with issues in the DoD in a consistent manner especially when it comes to decision-making."* (Participant A)

Decision-making is another important element raised by the environmental policy. Environmental managers believe that without environmental policy it would be difficult to make decisions on environmental issues at unit level without the need to refer to higher authority. Absence of environmental policy would cause a lot of uncertainty and a long turnaround time for environmental planning and execution. Policies thus ensure that decisions are made in a consistent manner across all levels and specify environmental standards to be achieved (Participant B).

Environmental policies go beyond outlining how environmental impacts should be treated. They equip environmental managers with the information and knowledge necessary for sound environmental management. Figure 4.10 shows the importance of environmental policy.

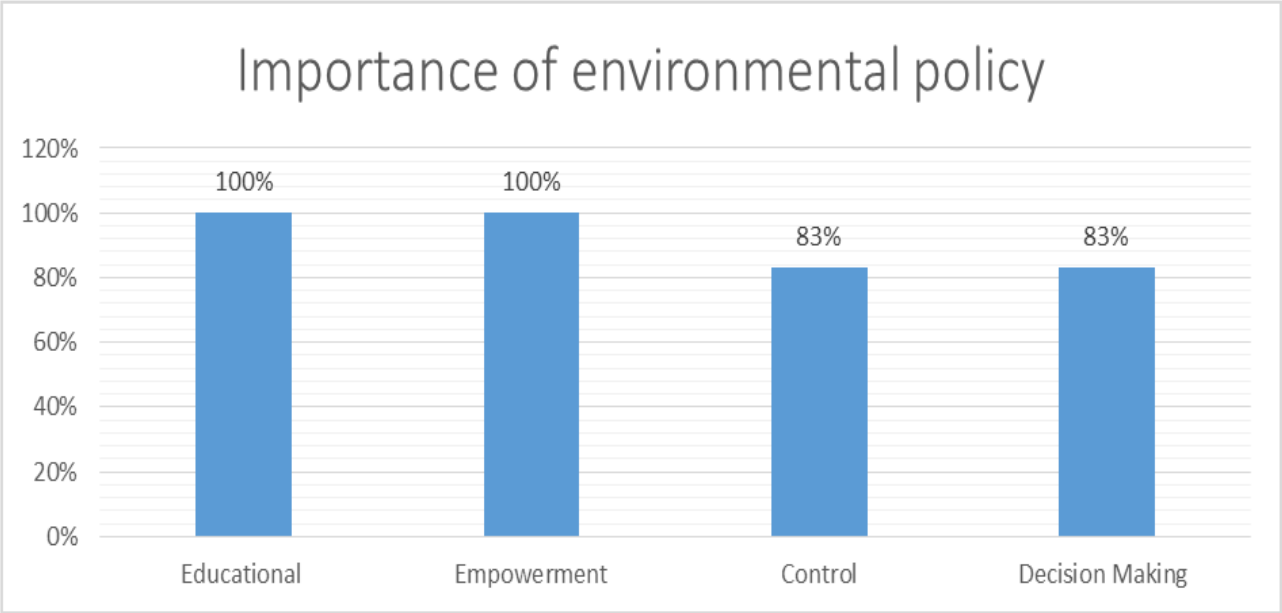


Figure 4.10 Importance of environmental policy

### 4.4.3 Benefits of environmental policy training

Education and training shape human behaviour (Moolman 2015). Kruse & Card (2004) reported that EM-related training influences environmental behaviour positively. In the same vein, Smit (2017) found that there is a positive correlation between environmental behaviour, environmental education and training. Environmental policy training is an important driver for sound environmental management as it provides the knowledge and skills of effective management of the environment. All the environmental managers interviewed reported that environmental policy training is conducted by the regional office for environmental managers and environmental representatives. Environmental experts in award-winning military units in the WCR reported the benefits of environmental policy training as depicted in Figure 4.11. Participants mentioned that

environmental policy training is conducted on a continuous basis, which provides an excellent opportunity for consultation and interaction among those involved.

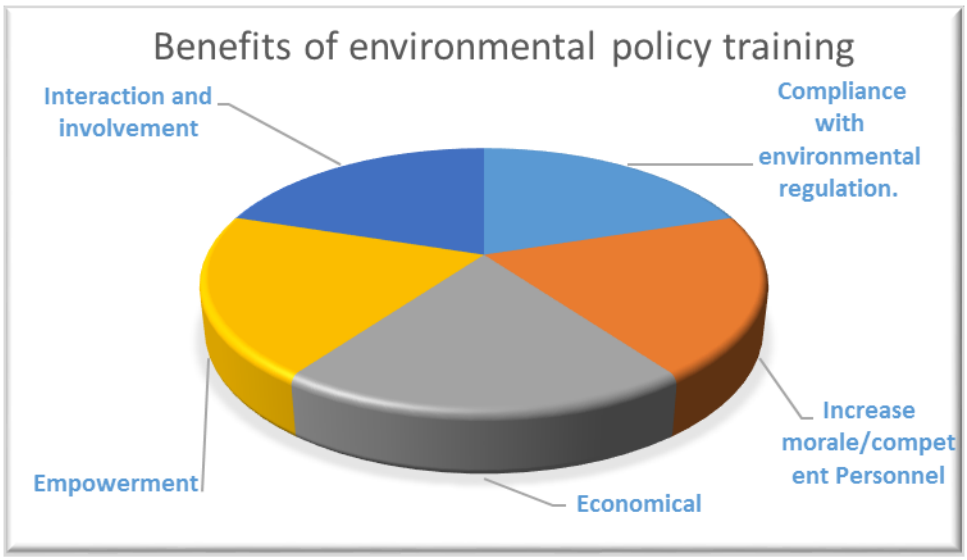


Figure 4.11 Benefits of environmental policy training

The importance of environmental policy training suggests that policies are critical mechanisms used by environmental managers to implement environmental management. This requires that environmental managers be knowledgeable about environmental policies as they are required to interpret and apply these policies.

*"Providing a mechanism to control the actions of the soldiers in my unit during their day-to-day functioning in the South African Defence Force*." (Participant A)
*"The policy also provides guidance and helps environmental managers to refer any offenders to that document [policy], and they believe more than when you just explain without referring to anyone."* (Participant C)

Participants in the current study revealed that they are undergoing environmental policy training. Environmental policy training provides benefits such as peer interaction and involvement, compliance with environmental regulation, empowerment, economic benefits and increased morale of personnel. These benefits are unpacked in Subsections 4.4.3.1 to 4.4.3.4.

#### 4.4.3.1 Interaction and involvement

Environmental policy training allows co-operation between different corporate divisions and functions within the SANDF (South Africa 2008). Ture & Ganesh (2014) found that employee involvement and participation are essential for implementing environmental management as they may contribute towards finding a solution to the environmental problems at a local or military base level and towards environmental improvement. Participants reported that their involvement and interaction during environmental training provide an opportunity for them to engage and build strong networks with one another and their facilitators (Participant D). Therefore, environmental policy training provides more than just an exchange of information. It makes provision for interaction and provides platforms for exchange of information.

#### 4.4.3.2 Compliance with environmental regulation

Training on environmental policy ensures that the members are aware of existing environmental standards and regulations (Hsu 2004). Mobley, Vagias & DeWard (2010) reported that more information about environmental management is likely to lead to improved environmental compliance behaviour. Thus, the more exposure to environmental policy training the higher the chances of being compliant with environmental legislation. This idea is not new and is in line with the findings by scholars such as Hungerford & Volk (1990), who viewed environmental knowledge as a prerequisite for acceptable stewardship of the environment. The participants reported that the environmental policy training provides them with a better understanding of what is expected of them and consequently increases their compliance with environmental regulation.

*"Provides more clarity on how to do our task. It boosts our confidence and creates certainty while preventing biasness at the same time."* (Participant A)

Environmental policy training equips environmental managers with the knowledge and skills necessary to comply with environmental regulations. This helps BEMs to know what is expected of them and how to comply with environmental regulations.

#### 4.4.3.3 Empowerment and economic benefits

Environmental policy training can improve productivity by improving the efficiency with which resources and energy are used (Rayment et al. 2006). Participants reported that they found policy training empowering in terms of understanding, interpreting and applying those policies. They also found that policy gives environmental managers powers to perform related environmental duties

and provides an environmental standard to be maintained and enforced. Participants agreed that policy training also provides a conceptual framework for understanding the application of environmental policies. Another benefit is the environmental efficiency that is achieved as a result of continuous training. (Participant B)

*"We are also able to use it to request funding to implement environmental objectives within the unit lines and training areas."* (Participant E)

The policy provides a way for environmental managers to deal with environmental issues efficiently and consistently. For example, environmental managers may make decisions regarding environmental issues without the need to consult for every problem, thereby saving time and money as a result of improved managerial competence and confidence.

#### 4.4.3.4 Improved morale and competent personnel

According to Magagula (2014), competent personnel can achieve sustainable environmental practices by establishing and maintaining linkages with experts, practitioners and other institutions. Participant A highlighted that environmental policy training improves their general and EM confidence and certainty. As one participant shared:

*A competent environmental manager with high morale can educate other members at the base and solicit the co-operation that is necessary for the successful implementation of the environmental policies without doubts* (Participant F).

Environmental policy training prepares environmental managers to confidently interpret policies, and communicate them to soldiers on the ground who must comply with environmental policies while executing their activities in an environmentally sound manner.

### 4.4.4 Environmental policy implementation

Subsection 4.4.3 reports the findings of the current research pertaining to environmental policy implementation. First, the process of ensuring environmental policy implementation is discussed, followed by the challenges of environmental policy implementation.

#### 4.4.4.1 Policy implementation

Potgieter (2001) states that environmental implementation hinges on the environmental policy framework and the environmental policy statement, as well as the guiding principles contained in the EIPs. Environmental policy implementation failures may undermine the commitment, legitimacy and credibility of an organisation and its processes (Knill & Lenschow 1998). This is relevant because environmental policies can be decoupled from the implementation process (Beradi & Renata 2015). Effective policy implementation occurs when capacity to implement policy and environmental policies correspond with the policy objectives and goals (Knill & Lenschow 1998). Participants mentioned a list of activities they undertake in order to ensure effective implementation of environmental policies (Table 4.4).

Table 4.4 Process of ensuring implementation of environmental policies

| S/No | Implementation of environmental policies |
|---|---|
| 1 | Continuous communication with all staff members using the following platforms: unit communication periods, notice boards and websites |
| 2 | Establishing environmental representatives in each section in the unit lines |
| 3 | Training environmental representatives in environmental policy |
| 4 | Maintaining strong links with other environmental officers and regional office |
| 6 | Integrating environmental consideration in all unit planning and activities |
| 7 | Filling in the environmental annual report proforma on a continuous basis |
| 8 | Monitoring performance and compliance by unit members and section reps |

The activities on the list are considered as building capacity for ensuring practical application of environmental policies. The list entails communication with members using existing platforms within military unit lines, followed by the appointment of environmental representatives from different departments and sections. The integration of environmental consideration in all unit planning and the maintenance of strong links with RFIMs and other BEMs are also seen as a critical part of ensuring effective implementation of environmental policies. Furthermore, it must be ensured that the environmental report proforma is completed on a continuous basis, performance is monitored regularly, and the environmental compliance of unit members and section representatives is also assured.

*"I ensure that the policies are communicated to all the unit members ... I always ask [for] a slot during communication periods in the unit to share environmental related matters that capacitate*

*the members to be aware of possible ways to deal with environmental issues in the environment."* (Participant A)

*"I attend regional meetings on a quarterly basis or whenever necessary where further advice is provided on how to operationalise the national environmental policy, environmental implementation plans and various environmental instructions on unit level."* (Participant B)

*"By following the Environmental Annual Report, get other members of the unit involved and all the students attending training here."* (Participant E)

The role of environmental managers remains crucial in ensuring practical implementation of environmental policies, particularly because sound, yet unimplemented policy documents and plans are of little use. They provide the human capacity required for sound environmental management in the SANDF. For example, environmental managers remain responsible for interpreting, understanding, training and applying environmental policies and mechanisms, thereby ensuring effective and practical application of environmental management policies and practices.

#### 4.4.4.2 Challenges of policy implementation

Despite the implementation process discussed in subsection 4.4.4.1, participants, ironically, reported that the DoD is still experiencing policy implementation challenges.

Figure 4.12 illustrates the challenges faced by environmental managers in the military units. There are five main policy implementation challenges. These are: lack of funding, ignorance, lack of interest, personnel shortages/shortcomings, and inadequate structure.

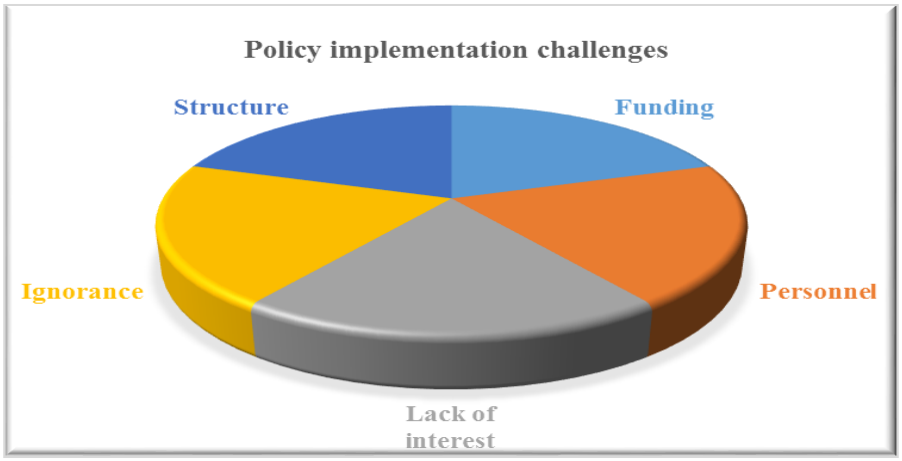


Figure 4.12 Policy implementation challenges

The second edition of EIP revealed some capacity gaps and limitations for environmental management in the SANDF. These gaps include insufficient budget, lack of skilled human resources, policy fragmentation, unimplemented EMS, inadequate environmental management structures and insufficient accountability because environmental regulatory obligations are not included in the performance agreements of respective Divisional Chiefs, GOCs and OCs. Lack of funding is a challenge that was highlighted more than a decade ago when the first EIPs were promulgated. To date the funding seems to remain a challenge (Magagula 2014; Smit 2017). Participants in this study mentioned that lack of funding is a challenge that limits their continuity and effectiveness of environmental management.

*"When there is no adequate funding to execute what is stipulated in the policy, application of environmentally sound practices is a challenge."* (Participant C)

Furthermore, participants in this study revealed that some challenges stem from the unit members, such as a lack of interest of the unit members to be involved in environmental issues, while Participant F mentioned ignorance towards environmental issues as a critical challenge. These challenges mean that the members do not honour environmental policies and environmental tasks. When it comes to personnel and structure, it is difficult for the SANDF to retain environmentally qualified personnel.

This status is aggravated by a general lack of environmental structure (Magagula 2014). In the current study, participants reported that military units did not have a formal structure and they experience shortages of environmental personnel. The GSBs have at least one environmental officer dedicated to supporting military units (Smit 2017). General Support Bases (GSBs) are to provide support for military units situated in specific geographic locations (South Africa 2001). The entire DoD has a total of 47 dedicated environmental posts to effect environmental management. These posts are situated between Level 2 (Director Facilities) and Level 4 (GSBs) (South Africa 2001). This situation reigns despite the recommendations of the pilot study by North Atlantic Treaty Organisation's Committee on the Challenges of Modern Society (NATO-CCMS) in 1996–1999. The final report suggested that the military sector should implement EMSs (Magagula 2014). The DoD responded positively to the NATO-CCMS recommendations and commenced with its pilot project for EMS in 2004 to 2007, but failed to implement EMS.

The reasons for the non-implementation of an EMS in the DoD to date are unclear. These gaps form a significant part of the challenges that hinder the implementation of effective environmental management in the DoD (South Africa 2001; 2008; Magagula 2014; Smit 2017). The AWMU seem to possess means to overcome these challenges. These means entail reprimanding members not following policies, ensuring that there is always an environmental representative in each section or department, and making sure they are empowered with environmental training.

# CHAPTER 5: MILITARY ENVIRONMENTAL MANAGEMENT PLANS AND PROGRAMMES

The environmental plans of the Department of Defence are informed by the environmental impact caused by three programmes, namely, provision, support and employment of forces. The provision of forces entails integrating and converting force components into combat-ready forces. Support of forces involves procuring armaments, as well as providing material and equipment to combat forces so that these can be used operationally. Employment of forces involves the deployment of forces in an operational capacity (South Africa 2018). During the execution of each programme there is some effect on the environment. This chapter presents the perceptions of environmental managers from AWMU in the WCR regarding the environmental plans and programmes of the DoD. First, the military environmental management plans for dealing with environmental management are presented and discussed. This discussion is followed by the impact of environmental management plans.

## 5.1 MILITARY ENVIRONMENTAL MANAGEMENT PLANS

This section 5.1 reports on the military environmental management plans managers used in AWMU in the WCR. Firstly, the military environmental management plans mentioned by the participants are presented. Secondly, the plans mentioned by environmental managers are discussed individually in the following sequence: Military Integrated Environmental Management (MIEM), Integrated Training Area Management (ITAM), Environmental Consideration in Operations (ECOPs), environmental interaction, environmental reporting, environmental training and environmental awareness.

### 5.1.1 Military environmental management plans mentioned by participants

Figure 5.1 illustrates that all participants from AWMU reported that environmental reporting, interaction, training and awareness constitute part of the plans they are using in dealing with environmental management in their respective units. Some 67% considered MIEM as one of the plans they are using to fulfil their environmental responsibilities and duties. Integrated Training Area Management (ITAM) is considered by 33% of the respondents to be one of the plans used to achieve environmental objectives, while ECOPs are mentioned by only 17% of the participants.

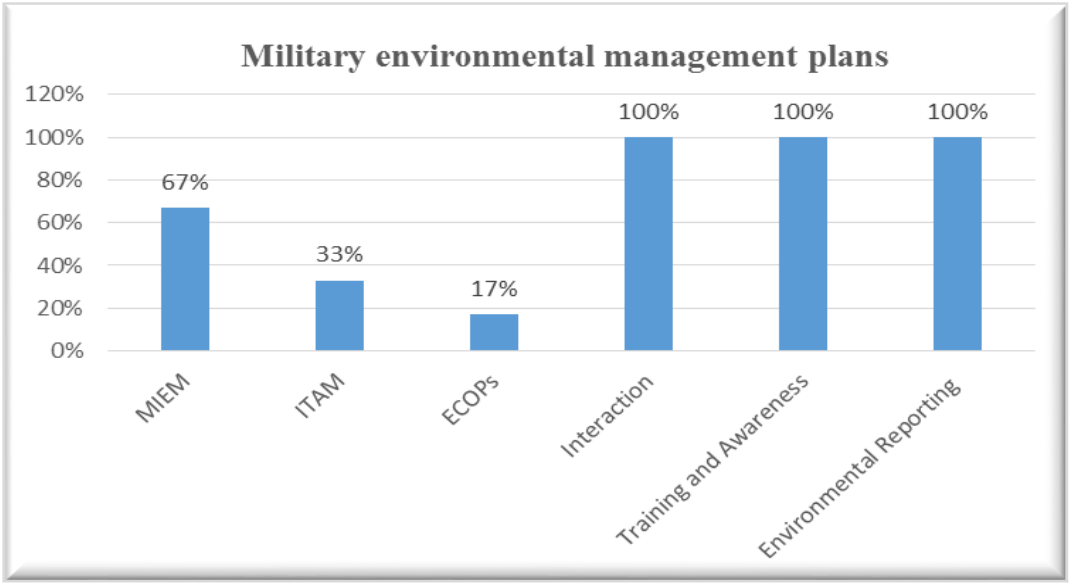


Figure 5.1 Military environmental management plans

The results reflected by participant responses suggest that environmental reporting, interaction, training and awareness are the most common plans used to drive military environmental management in AWMUs. The second-most used military environmental management plan is MIEM. The least-used military environmental plans are ITAM and ECOPs respectively (Figure 5.1).

### 5.1.2 Environmental reporting

The environmental reports provide the means by which the effort of a military base towards the environment can be measured and communicated (South Africa 2008). The SANDF expects all military base environmental reports to be submitted to their respective regional offices annually (South Africa 2008). The process of environmental reporting starts when units record all their activities, and register these records in a questionnaire distributed to all the military units (South Africa 2008). The questions in the questionnaire are structured in a way that guides both the Commanding Officer (OC) and BEMs. Ramos et al. (2008) state that the implementation of environmental management plans in a military facility is a growing reality. The SANDF responded purposefully to bring environmental management plans in line with international trends (Potgieter 2001). Thus, the current study's findings are in line with Ramos et al. (2008), who state that environmental reporting is a crucial step in the process of environmental management in the military sphere.

A demonstrable positive environmental stance can improve the public image of the organisation since military activities are an issue of public concern (Pramanik, Shil & Das 2009). This is relevant also because of the proximity of military bases to civilian communities and their many activities that affect the environment beyond the physical bounds of designated military areas (Ramos et al. 2008). The participants agreed that environmental reporting is one of the plans they use to advance military environmental management in the military installations.

*"I follow the proforma of the environmental management report in performing my duties as an environmental officer."* (Participant A)

Environmental reporting provides valuable information to defence or military decision-makers, policy-makers and interested non-military parties. In a way, environmental reporting demonstrates to interested parties the seriousness of the DoD in dealing with environmental issues that impact in and beyond the military. The environmental report is a crucial driver in a sense that it provides

clarity on what should be done in a simple and logical manner. The environmental reports can potentially be used to monitor the performance of BEMs on a continuous basis.

### 5.1.3 Environmental training and awareness

The purpose of environmental training and awareness is to empower personnel with environmental knowledge, skills and motivation to solve environmental problems (Moolman 2015). Militaries may achieve the goal of having every soldier acting in an environmentally responsible manner through environmental training and education (Godschalk 1998; Smit 2017). Environmental training and awareness must be implemented at all levels, from commanders to soldiers, at tactical level (Ferro 2012). The benefit of environmental training and awareness programmes is increased environmental awareness and environmental responsibility among military members (South Africa 2008).

This research found that all the participants in this study are involved in training and awareness programmes as either students or facilitators. BEMs make use of environmental days, such as World Environmental Day, Earth Day and World Forest Day, to mention just a few, to advance environmental awareness in their units.

Posters, notice boards, visits to nature reserves, hiking trails, pamphlets, communication periods, scheduled classes and the intranet are some of the examples of methods and platforms used to convey environmental awareness and training information (Participants B, C, D and G).
The knowledge obtained through training or gained through awareness programmes implies that soldiers are likely to display improved pro-environmental behaviour.

*"The plans we have are training further, aimed at improving environmental awareness and incorporation of environmental consideration in planning of various activities to unit rank-carrying members and non-rank-carrying members, including the non-uniform members present in the unit."* (Participant A)

The success of environmental implementation on a continuous basis is dependent on the active involvement of every member (Participant I). For OCs, a guide to environmental compliance exists, with the aim to assist with ecological knowledge and legal compliance concerning environmental protection (Participant H). Unit members and section representatives work closely with BEMs. A well-conducted military training and awareness programme may enable military members to execute their activities in an environmentally responsible manner. Thus, the AWMU have

environmental training and awareness programmes that are conducted on a continuous basis as drivers of environmental management. They equip members at the execution level with environmental skills, attitude and knowledge necessary for solving environmental issues.

### 5.1.4 Interaction

Interaction provides excellent public relations and community relations, demonstrates reasonable care, and fosters development and sharing of environmental solutions (Magagula 2014; Potgieter 2001). Interaction involves communication through platforms such as conferences, training programmes and meetings (Godschalk 1998; Ferro 2012). All respondents agreed that there is a robust interaction between the military units in their region. They explained the interaction within the DoD as a working group that includes RFIM and base environmental managers in the WCR.

*"I also have planned quarterly meetings which I attend where the environmental performance of different units is discussed and better ways of dealing with challenges are shared."* (Participant A)

Furthermore, respondents mentioned that the interactions are mainly planned, organised and monitored by the RFIMs, and supported by their OCs. The benefits of interaction include capacity building, sharing of knowledge and clarification of uncertainties, which may all lead to improvement of environmental performance.
In addition to these, the quarterly meetings provide an opportunity for practical demonstration of environment-related functions. Thus, the interaction can be considered an important driver of environmental performance.

### 5.1.5 Environmental consideration during military operations

Environmental issues are global in nature. Militaries are involved in the process of integrating them into the planning and implementation of military operations (EWSG 2006). This process is called environmental consideration during military operations (ECOPs). For ECOPs to be successful, inputs regarding environmental consideration must be planned and integrated in advance. EWSG (2006) believes that if military organisations do not prepare, establish and implement procedures to minimise the impact of their activities, they will face challenges such as failure to protect the force, and environmental concerns. This view is reinforced by Magagula (2014:147) as his findings state that, for the SANDF to "integrate environmental protection practices effectively into its activities and to improve its environmental performance, it needs to plan and budget accordingly". Magagula (2014) regards a budget as a requirement for successful integration of environmental issues and

improvement of the environmental performance. Participant A reports that ECOPs' guidebooks are available for implementation purposes for operational units. Results further show that standard operating procedures (SOPs) concerning all the actions that must be taken at military unit level when preparing for military operations exist.

*"We mainly follow the guide lines on environmental considerations during Military Operations (ECOPs) and we make sure that they are iplemented."* (Participant A)

This guidebook further clarifies all the necessary steps that must be undertaken to achieve effective environmental management. The ECOPs are relevant to operational units. All participants from the operational units mentioned ECOPs as one of the plans. This implies that ECOPs are one of the drivers of environmental management in operational units.

### 5.1.6 Integrated training area management

Integrated training area management (ITAM) provides possible ways of addressing environmental impact of military actions on the environment in compliance with regulatory obligations (South Africa 2008). ITAM integrates military training activities with constraints posed by the natural environment (South Africa 2008).
Godschalk (1998) defines ITAM as a process that integrates environmental considerations into all aspects of managing a training area. Management of training areas provide perfect conditions for integrating environmental issues because training occurs under highly controlled circumstances and is thoroughly evaluated (Godschalk 1998).

Some 33% of the participants in this study reported that they use the ITAM guidebook. They publish the procedures from the ITAM guidebook in the Part 1 Order of the unit. The benefits of publishing the SOP in the Part 1 Order are associated with command and control. It is thus easier for environmental managers to convince / move all soldiers in the unit to apply the same techniques aimed at achieving the incorporation of environmental issues into planning of military activities.

*"The plans are included in Part 1 Order of the unit and SOPs."* (Participants B)

ITAM guidelines are critical because actions of soldiers are repetitive in the training areas. Their actions can be monitored and evaluated and, based on the results, environmental performance can be improved. Thus the principles of ITAM are applied in military training areas. The 33% of BEMs

who are from AWMU with training areas under their control considered ITAM guidelines as a driver of effective environmental management.

### 5.1.7 Military integrated environmental management

MIEM means that environmental issues are considered in all stages of military involvement, from policy formulation to application of any military plan, process or product (South Africa 2008). Magagula (2014) shows that environmental managers are critical in MIEM as he states environmental managers are the interpreters of defence policies and programmes and translate them into action. Magagula (2014) further states that for environmental managers to be able to achieve their tasks they must be competent and highly trained.

A large number of militaries across the world are using MIEM to achieve improved environmental management performance (Wang & Wu 2013). In the current study, 67% of the participants reported that they follow the MIEM approach in all their activities. This implies that integration of environmental issues is taken into consideration throughout the three programmes of provision, support and employment of the SANDF explained in the introduction of this chapter. Respondents further clarified that they attend workshops and quarterly meetings where the RFIMs guide them step by step.

The RFIMs demonstrate how MIEM is applied in the day-to-day functioning of the military unit. Thus, MIEM can be seen as a driver of effective environmental management in military units.

## 5.2 IMPLEMENTATION OF MILITARY ENVIRONMENTAL MANAGEMENT PLANS

The implementation of military environmental management has a direct impact on environmental protection (South Africa 2008). It encompasses the allocation of financial and human resources and military environmental management plans (MEMP) (Magagula 2014; South Africa 2008). Availability of these resources and application of MEMP ensure effective environmental management (South Africa 2008). Effective implementation of environmental management is dependent upon all forms of resources (Magagula 2014). Daily & Huang (2001) states that environmental management plans, together with the goals of the organisation should be communicated to employees so they may know what is expected to achieve effective environmental management standards.

Participants in the current study reported that the implementation of environmental management plans has its own challenges and, as a result, requires commitment, support from top management of the unit and co-operation from unit members.

*"Implementation sometimes is a challenge; however work needs to be done. Personal sacrifice becomes the order of the day and with support from management and co-operation amongst sections and members, then environmental objectives are to be obtained."* (Participant C)
*"The implementation is always a struggle since we have no structure in the unit. So in most instances we depend on people from different sections to help us with environmental work. It is the unity forged by different sections that makes the implementation easier and very practical."* (Participant C)

Challenges include lack of funding, structure and personnel in AWMU. These are discussed in Section 4.4.4.2. To overcome the challenges, BEMs need to be creative in terms of developing strategies and ways to accomplish their environmental task. Participants also mentioned that commitment towards environmental management and hard work are necessary to compensate for the shortage of personnel and financial resources. Furthermore, participants revealed that they undertake certain actions to ensure effective implementation of environmental management plans. Table 5.1 display actions to ensure effective implementation of environmental management plans.

Table 5.1 Summary of actions to ensure effective implementation of the environmental plans

| S/No | Actions to ensure effective implementation of the Plans |
|---|---|
| 1 | Appointment of environmental representatives in all the sections in the unit and holding them responsible for their duties |
| 2 | Ensuring proper reporting and monitoring of all environment-related activities |
| 3 | Involving all unit members in all environment-related tasks |
| 4 | Making SOPs for all aspects of the environment |
| 5 | Ensuring support for OC and co-operation among unit members |
| 6 | Conducting environmental education, training and awareness |
| 7 | Ensuring communication, command and control through existing platforms |
| 8 | Promoting creativity, commitment and hard work |

Environmental managers in AWMU appoint environmental representatives from different sections and departments and hold them responsible for environmental duties assigned to them. The actions that environmental representative are expected to perform are added to the unit's Standard

Operating Procedure (SOP). This prevents duplication of tasks and confusion in terms of areas of responsibility and assists with command and control.

*"We ensure that all the members have SOPs and we train members continuously*." (Participant B)

All unit members are encouraged to participate in all unit environmental activities such as environmental education, training and awareness conducted by RFIMs, BEMs and section representatives. This means that unit members at all levels are exposed to the knowledge and skills required to accomplish the objective of environmental management plans.
*"We ensure that training with regards to plans and procedures takes place."* (Participant F)

The existing communication platforms and command and control channels are reportedly used to ensure that environmental activities enjoy the support and co-operation of unit management, from OC to all section commanders. These platforms promote two-way communication on environmental issues. Information flows from both top- and lower-level employees and all have access to the latest information on environmental impacts.

The environmental annual report – which details the functional strategies on environmental planning, environmental research, environmental education and awareness training, base environmental management, ecological management and cultural resource management – is given to each BEM. The report guides the BEMs step by step in terms of their environmental responsibilities. Furthermore, it means that environmental activities of the unit are traceable and non-conformity can be detected from the report. The information on the reports reflects the status of environmental management in each unit. Therefore, the environmental report is a significant driver of effective environmental management in each of the AWMU in addition to the environmental management plans mentioned above.

## 5.3 IMPACTS OF IMPLEMENTING ENVIRONMENTAL MANAGEMENT PLANS

The implementation of environmental plans impacts by reducing environment-related sicknesses, and risks of polluted air, land and water (Shen & Tam 2002). Furthermore, it highlights the need for proactive attitude and sound environmental management (Wong 1998). Daily & Huang (2001) report that environmental management plans, especially training, may lead to increased employee responsibility. The overall impacts of the implementation of environmental management plans are environmental protection, improved corporate image in environmental management and improved

pro-environmental behaviour (Shen & Tam 2002). According to the second edition of EIPs of the DoD 2008, the intended impact of these plans is to increase environmental knowledge, skills and awareness of soldiers in order to reduce the environmental impact associated with military activities, while ensuring compliance with statutory environmental management requirements (South Africa 2008).

Participants highlighted a numbers of impacts of environmental management plans, such as increased environmental awareness of soldiers, which resulted in improved decision-making during the execution of military tasks that may have a potentially adverse impact on the environment.

*"The impact is that members of the base are aware of the importance of the environmental impacts and can make decisions easily as the plans provide people with practical ways of taking care of the environment."* (Participant A)

*"Awareness about the importance of environment is increased. Consequently, members volunteer their services in caring for the environment, thus ensuring that the environmental plan is implemented. People are well trained, know their responsibilities very well and are equipped to perform their duties. It gave people exposure."* (Participant B)

Soldiers' sense of environmental responsibility after going through the environmental plans improved, as did team work among members of different sections in the unit. There was also reduced cost due to the reduction of environmental penalties and pollution fines. The implementation of environmental management plans improves the corporate image in environmental performance and attracts the support of top management. Another impact mentioned by the participants was improved environmental performance in military bases and training areas within their control. The impact of the implementation of environmental plans is encouraging as they have a positive effect on unit members. Table 5.2 summarises the impact.

Table 5.2 Summary of the impact of environmental management plans

| **S/No** | **Impact of environmental management plans** |
|---|---|
| 1 | Increased awareness |
| 2 | Improved decision-making |
| 3 | Economical (reduced costs) |
| 4 | Improved team work |

| | |
|---|---|
| 5 | Increased support |
| 6 | Increased sense of responsibility |
| 7 | Improved environmental performance |

The impact of environmental management plans mentioned by participants is considered to be necessary for improved environmental performance (Shen and Tam 2002). Thus, environmental plans mentioned by the respondents are drivers of effective environmental management in AWMU.

The impact of the environmental management plans as reported by award-winning environmental managers was multiple. Participants reported that the members at base level are aware of the importance of environmental impact and, as a result, have begun to care better for the military environment and natural resources. In other words, on a daily basis unit members develop a sense of ownership of the concept of sustainability. Participant C highlighted that once members have attended environmental training and awareness, they make informed decisions. For example, different sections and military homeowners take care of the immediate surroundings, and ownership of the maintenance of the environment, such as gardens and training areas in their care. Participant B stated that once members are well trained, they know their responsibilities well and are equipped to perform their duties. Thus, the impact, in a nutshell, is pro-environmental behaviour from all the members at unit level.

Respondents agreed that the actions stipulated in Table 5.1 ensure the effective implementation of the environmental plans. The impact in Table 5.2 demonstrates that environmental management plans are able to increase environmental awareness, improve the knowledge of unit members as well as the environmental management performance of members and their particular unit.

# CHAPTER 6: CO-OPERATIVE ENVIRONMENTAL GOVERNANCE AND ENVIRONMENTAL MONITORING MECHANISMS

This chapter reports the findings on co-operative environmental governance, environmental monitoring mechanisms and general perception of the participants. Co-operative governance describes the internal and external approach to environmental management issues in SA DoDMV. This is followed by a discussion of mechanisms for monitoring environmental performance. These mechanisms include the Environmental Review Forum (ERF), Regional Environmental Advisory Forum (REAF), Annual Environmental Management Report, auditing, the Environmental Award Programme, communication, ad hoc relations, and a guide to environmental compliance for the Officer Commanding. The attributes of BEMs contributing to the effective environmental management conclude the chapter.

## 6.1 ENVIRONMENTAL CO-OPERATIVE GOVERNANCE

Environmental co-operative governance is defined as the mechanism that may be applied with the aim to facilitate sustainable relations between government departments and distinctive divisions within each department (Kotze 2005; South Africa 2008). This does not refer only to co-operation between different governments and divisions within the department; it also includes co-ordination between government departments and within different divisions within the departments (South Africa 2008). The SA DoDMV is expected to apply reasonable means in order to comply with all relevant environmental legislative provisions that have a bearing on it, including external and internal co-operative environmental governance (South Africa 2008). Thus, external and internal environmental co-operative governance for ensuring effective environmental management in the SA DoDMV are discussed in this section.

### 6.1.1 External environmental co-operative governance

External interaction entails mechanisms of co-operation relating to environmental management between the SA DoDMV and other departments or spheres of government, as well as those relationships that are necessary to exercise the SA DoDMV's function (EIP 2008). The external interaction between the SA DoDMV and other departments and institutions can yield positive benefits (Magagula 2014). The SA DoDMV has established external co-operative governance with

various national departments, NGOs, provincial governments, local governments and tertiary institutions (South Africa 2008).

Their interaction with the SA DoDMV represents a formal co-ordinating mechanism for environmental co-operative governance (South Africa 2008). Representatives from the mentioned departments and institutions provide environmental expert advice to the SA DoDMV's environmental managers. They also assist with the selection of winners of annual environmental awards (South Africa 2008). The external expertise involved in the selection of environmental award winners provides an opportunity not only to evaluate environmental performance of the SANDF, but also to share their expertise on environmental issues (South Africa 2008). The interaction at this level can result in "accurate interpretation of policies and directives, keeping abreast of the best environmental practices and maintenance of transparency on environmental issues" (Magagula 2014:156).

All participants in this study acknowledged the existence of the interaction between the DoD and other national departments and provincial departments. Section 2.3.3 of this thesis focused on these national departments. The other interaction reported is with local schools, SanParks, West Coast National Park, Water Quality Forum, the Fire Prevention Association (FPA), the Heuningberg Advice Committee, and other institutions. Two-thirds of the participants stated that there are projects that they participate in together with external bodies. These interactions occur mainly during scheduled environmental events published on the national calendar. Most of the interaction with external entities was reported to be at unit level. Participants stated that they are involved with the local municipalities, nearby schools, the farming community around the military base and various environment-related local committees. Examples of these local committees include the Park Forum of Agulhas, Overberg Review Committee, Environmental Impact Assessment Study Society, West Coast Environmental Group, Waenhuiskrans Vissers Gemeenskap Forum, Water Quality Forum and Heuningberg Advice Committee.

*"Outreach projects mainly with primary schools, namely St Helena Bay Primary School, Steenberg Cove Primary School, Langebaan Primary School and Holvlei Primary School."* (Participant B)

*"Yes, West coast National Park, Municipality and local schools (mainly primary schools, Grades 3– 7) and farmers around our base."* (Participant D)

*"Yes. We are part of the Park Forum of Agulhas Parks, Overberg Review Committee, the FPA and the Heuningberg Advice Committee."* (Participant F)

*"Yes, Cape Nature reserve"* (Participant E)

These responses from participants show that at military unit level environmental managers have external linkages. Moreover, participants revealed that they did not face any challenges in interacting with outside institutions and departments. The OCs support the external interaction with other institutions and the results are visible in the manner in which they are performing their environmental duties.

*"Through networking with the different organisations that are involved in these forums, we build a good working relationship. Whenever we need assistance with awareness training or other projects we get support from SAN Parks and Cape Nature as well."* (Participant F)

According to participants, the contribution of these interactions includes knowledge generation, an increased understanding of environmental issues, sharing of resources, working relationships and improved environmental awareness.

The current study found that environmental managers of military bases have interactions outside their units, but not with international organisations. All those involved during interactions share environmental challenges and solutions to environmental problems. Flourishing interaction at base level resonates well with the concept of co-operative governance. Through the idea of co-operative governance, the DoD can build and expand its knowledge and skills capacity. The results of the study affirmed that interactions lead to improved environmental performance. Thus, external interaction can be considered an important driver of military environmental performance.

### 6.1.2 Internal environmental co-operative governance

Internal environmental co-operative governance encompasses mechanisms of co-operation and co-ordination relating to environmental management between distinctive corporate divisions and functions within the Defence Force (South Africa 2008). The mechanisms of co-operation and co-ordination are structured to ensure effective implementation of environmental management (South Africa 2008). This is in line with military environmental management trends that encourage the establishment of monitoring mechanisms to ensure improved environmental performance in the military sector (Magagula 2014; Ramos et al. 2008). Figure 2.4 in Chapter 2 illustrates the internal co-ordinating mechanisms in the DoD. Internal environmental co-operative governance in the Western Cape includes the DoD's Environmental Services Sub-Steering Group, Base

Environmental Working Group, Standing Liaison Forum and the DoD RFIM Working Group Cape Town (South Africa 2008).

All respondents agreed that there is robust internal environmental co-operative governance between the military units in their region. Furthermore, the respondents mentioned that internal interaction is mainly planned, organised and monitored by the RFIMs while being supported by their Officers Commanding. All the award-winning environmental officers mentioned that the interactions were helpful and beneficial. Moreover, participants reported that RFIMs are monitoring the environmental compliance of each unit through quarterly and annual reports. The benefits of internal environmental co-operative governance include capacity building, the sharing of knowledge, ideas and resources and the clarification of environmental uncertainties.

*"Yes, we do have interactions amongst the military Units on the West Coast such as SAS Saldanha (Navy training Unit in Saldanha) and 4 Special Force Regiment in Langebaan … We meet with all the environmental mangers from all other units in the Western Cape Region. The interactions mainly address plans and ways of solving environmental issues. These include all arms of service environmental managers within the Western Region."* (Participant B)

*"The meetings are facilitated and arranged by the regional office, and the interaction between the other military units are always encouraged and supported by the Commanding Officers."* (Participant A)

*"Exchange of ideas on how to deal with environmental issues. Sharing of resources as well. This enhances our effectiveness."* (Participant E)

The interaction within SA DoDMV in the WCR is mainly between the OCs, BEMs and the RFIM. These interactions contribute to the function of environmental management. For example, base environmental managers can learn from one another, and they get to exchange information on challenges they face and how they solve those challenges. Moreover, sharing of challenges also helps them reflect on how they function as individual military units and how they may improve their environmental performance. During the quarterly meetings, challenges are discussed, and members also receive training in environmental management-related matters. Hence base environmental managers, environmental representatives, RFIM and OCs are playing a critical role in directing and controlling internal environmental co-operative governance and implementation of environmental management. The Environmental Services Sub-Steering Group and Standing Liaison

Forum were not mentioned by participants. This implies that participants only reported on internal co-operative mechanisms with which they are involved.

In the same vein, participants did not report on any international relationships. They stated that they were not involved internationally despite the fact that Section 2.3.3 shows that there are provisions in place for international partnerships pertaining to environmental management. Therefore, only the internal environmental co-operative governance mentioned by participants can be considered as one of the drivers of effective military environmental performance. These are RFIMs, OCs, BEMs and the environmental representative in military unit lines. The following section discusses the monitoring mechanisms of environmental management in the SA DoDMV.

## 6.2 MONITORING MECHANISMS OF ENVIRONMENTAL MANAGEMENT

Trends in military environmental management research have focused on monitoring mechanisms and environmental performance in the military sector (Ramos et al. 2008; Magagula 2014). The South African Department of Defence has established its own mechanisms to monitor both the implementation of environmental management and its performance (2008). These mechanisms include the Environmental Review Forum (ERF), the Regional Environmental Advisory Forum (REAF), the Annual Environmental Management Report, auditing, the DoD Environmental Awards Programme, communication and ad hoc relations, as well as a guide to environmental compliance for Officer Commanding. This section discusses each of these mechanisms in more detail.

### 6.2.1 Environmental Review Forum

The Environmental Review Forum (ERF) consists of representatives from each corporate division and service within the SA DoDMV. The primary aim of this forum is to design and develop the EMS, while its secondary aim is to review environmental performance (South Africa 2008). This forum designed and developed the EMS in 2004. Shortly after its completion, a draft was piloted, but the pilot study was suspended indefinitely in 2007. To date, the reasons for stopping the pilot project or failure to implement EMS has not been published anywhere (Smit 2017). The ERF is situated at Level 2 under the leadership, command and control of the Senior Staff Officer (SSO) in Environmental Services (ES) in Pretoria (Smit 2017). Participants reported that they are aware of the existence of ERF. Furthermore, they revealed that they are not directly involved with ERF as BEMs. When the BEMs were asked about how this forum is functioning, they highlighted that it

was supposed to review the environmental performance of the entire SA DoDMV but demonstrated high levels of uncertainty about how it functions and whether it is functional or not.

*"ERF indirectly assist us because it is only regional officers who attend the meetings with the SSO in Pretoria and give us feedback with regard to the environmental issues on the quarterly meeting we host in the Western Cape."* (Participants C)

The gap in information can be explained by the channel of command and communication that exists in the DoD. The channel of command dictates that base environmental managers interact with RFIMs within the various regions. In turn, RFIMs works closely with ERF. Thus, ERF mechanism cannot be considered a driver of effective environmental management in the AWMUs in the WCR.

### 6.2.2 Regional Environmental Advisory Forum

The Regional Environmental Advisory Forum (REAF) was formed to corporately implement and monitor the environmental performance of the DoD (South Africa 2008). REAF, as an entity, conveys insight and information concerning DoD activities and management of its resources to both the RFIMs and provincial authorities' representatives. Furthermore, South Africa (2008) states that the RFIMs are working closely with both the ERF and REAF, and they are the ones that communicate all expert advice from these two forums to the base environmental managers. The BEMs revealed that the REAFs work hand in hand with RFIMs. Furthermore, they also reported that when they meet RFIMs at scheduled quarterly meetings, environmental issues discussed by the REAFs are communicated to them. When the BEMs were asked how this forum is helping them, they highlighted that it provides information on environmental issues.

*"REAFs keep environmental officers informed about new environmental developments, instructions or legislation and the implementation thereof in the DoD."* (Participant F)

Regarding the functioning of the REAFs, the BEMs seemed to be aware that REAF is a mechanism for monitoring environmental performance but were uncertain about how this body functions. Responses from Participants C, B and F are examples of how the monitoring aspect was emphasised without explaining how the REAF functions.

*"REAF provides for an effective mechanism to monitor the department's environmental performance."* (Participant C)

*"This forum is the mechanism for monitoring the environmental performance; it is carried out through the regional office."* (Participant B)
*"REAF provides [the] mechanism to monitor environmental performance."* (Participant F)

Similar to the ERF explained above, the lack of clarity in terms of the functioning of the REAF is due to the gap caused by the channel of command. Thus, the REAF cannot be considered to be a driver of effective environmental management in the AWMU in the WCR.

### 6.2.3 Annual Environmental Management Report and Auditing

The Annual Environmental Management Report (AEMR) is accepted as being able to assist and empower OCs and BEMs to ensure that military activities are carried out in an environmentally sustainable manner (South Africa 2008). In addition to empowering the OCs and the BEMs, the use of AEMR provides the set of Environmental Management (EM) guidelines that must be followed by each military unit. Furthermore, it serves as the auditing mechanism that measures the environmental performance of each unit (South Africa 2008). There are three levels of auditing when it comes to implementation measures, environmental performance and compliance. These are the external audit by the Office of the Auditor General, internal audit by the Defence Inspectorate and DoD Environmental Service audits (South Africa 2008). These are in line with the EM inspectorates that were formed in 2005 by the Department of Environmental Affairs and Tourism (Magagula 2014). The BEMs drive the process of AEMR and their responses acknowledge the guidance offered by the AEMR. Through the completed AEMR, various departments and RFIMs have a starting point to evaluate the environmental performance of every military base.

*"AEMR is like a road map that shows you what direction to take along the journey to being an environmental sustainable unit."* (Participant A)

*"Yes, as AEMR directs us on what to do. AEMR provides step by step what actions that need to be done."* (Participant F)

On the question concerning the preparation of the AEMR, participants revealed that the AEMR features as a questionnaire that offers procedures on how to approach environmental issues in military unit lines. They agreed that those procedures are easy to follow. Additionally, the reports

help base environmental management to do an internal unit audit before any other form of an audit can be conducted.

*"I just fill all the answers in the environmental report by recording everything I did. I do this every quarter."* (Participant C)

*"We record everything relating to the environment following the report proforma."* (Participant F)

*"It guides you as you fill it in with information of environmental management guidelines in the form of a compulsory annual report, and to utilise these guidelines as an auditing mechanism in order to measure the military installation's environmental performance."* (Participant B)

*"The environmental report guides because it shows which part of the environment must be dealt with. As a result, we do not hesitate about which aspect of the environment must be our focus. Internal audits take place twice a year, conducted by the environmental officer. [There is an] external audit by Regional Office once a year, as well as an IG audit once a year."* (Participant D)

This process of evaluating environmental performance allows government departments, both national and provincial, NGOs, institutions of higher learning such as university of Pretoria, ERF, REAR and RFIMs to reflect on environmental practices and performances in military units. Participants agreed that the AEMR contributes significantly to effective environmental management as it provides practical steps to be taken, and provides the environmental officer with the information required to get the work done. The internal audits conducted by the BEMs in the unit are important as each unit can self-correct during these audits before the external audits, thereby improving their own environmental performance. Thus, the AEMR and auditing are critical drivers of effective environmental management in the AWMU in the WCR.

### 6.2.4 DoD Environmental Awards Programme

There are eight environmental awards for good environmental performance, which are discussed in chapter 2, subsection 2.3.4 of this thesis. Environmental awards may be considered good indicators of effective environmental management (Hassan & Ibrahim 2012). As already discussed in Chapter 2, environmental awards are awarded to military units and individuals who have sound environmental performance in one or more of the eight categories. The AEMR is used as an official entry to the eight categories (South Africa 2008) and was identified by participants as an important

driver of effective environmental management in chapter 6 subsection 6.2.3 of this current work. The SA DoDMV uses the environmental awards as mechanisms to monitor the implementation of environmental management and performance (South Africa 2008).

Participants revealed that the Environmental Awards Programme encourages them to remain focused throughout the year and provides a platform for networking and the sharing of ideas. This gives winners an opportunity to interact with various people from different departments, especially during the awards ceremony.

*"The DoD Environmental Awards Programme motivates us to keep doing more and more."* (Participant I)

The annual environmental awards programme is good for inspiring the BEMs to achieve sound, sustainable environmental practices. Thus, the awards programme may also be considered a driver of effective environmental management since awards encourages the environmental managers to strive for improved environmental performance.

### 6.2.5 Communication and the guide to environmental compliance for Officer Commanding

Officers Commanding are responsible for "ensuring the implementation of proper environmental management and control of military properties under their command" (South Africa 2008:67). OCs are given a guide to environmental compliance, which is aimed at providing a summary of environmental legislation covering relevant military activities and provides guidance on what actions or possible actions should be taken. This is in line with US Army regulation 200-1, which states that OCs must monitor and track environmental performance (Army US 2007:10). Communication with other organisations is a monitoring mechanism, and is discussed in Subsection 2.3.4. Moreover, communication and ad hoc relations in AWMU are encompassed in both external and internal co-operative environmental governance, which are discussed in Sections 6.1.1 and 6.1.2 respectively.

Participants have reported having active communication with other departments situated in proximity of the military bases. Examples of these include local schools, farms, NGOs and municipalities. In this study, it transpired that the OCs are involved in environmental issues and support the environmental effort of the BEMs as guided by the environmental compliance for the OC. This support includes providing military resources such as military vehicles and miscellaneous

funds available for environmental management purposes. Thus, the involvement of the OC may also be considered a driver of effective environmental management.

## 6.3 CAPACITY GAPS AND LIMITATIONS

The SANDF has budget constraints, a shortage of environmentally qualified personnel and does not have an environmental management structure (South Africa 2008). The entire SA DoDMV does not have a budget allocated exclusively for military environmental programmes and services (Magagula 2014). The SA DoDMV budget is decreasing, and this can be seen when comparing the 2017/18 (ZAR48.9 bn) and 2018/19 (ZAR47.9 bn) budget (Helfrich 2018). Insufficient funding has a negative effect on environmental management because it "prevents the DoD from complying with international, national and provincial environmental legislation and the implementation of necessary environmental programmes within the department" (South Africa 2008:68), even though "environmental funds are one of the most important tools for the effective implementation of environmental management in any organisation" (Magagula 2014:147). Thus, if budget cuts continue, and the DoD is serious about incorporating environmental issues into its activities, alternative sources of funding – such as Global Environmental Facility (GEF) and the Development Bank of Southern Africa (DBSA) – must be approached to source additional funds (Magagula 2014). According to Magagula (2014), some personnel appointed as environmental managers do not even have a working knowledge of environmental management issues. These findings are supported by Laubscher (2016 Pers Comms) who states that such challenges are impeding the progress of the environmental services in the SA DoDMV.

The SA DoDMV has inadequate environmental management structures at all levels to implement environmental management within the DoD (South Africa 2008). Strengthening of internal organisational structures is necessary for co-ordination purposes and for complying with environmental policies (Magagula 2014). Surprisingly, despite the number of awards won by respondents, they have highlighted a number of capacity gaps and limitations. They claim lack of funding, shortage of personnel and weak organisational structures set back the policy imperatives that the DoD has promulgated. Table 6.1 shows the list of the capacity gaps and limitations mentioned by participants.

Table 6.1: Capacity gaps and limitations mentioned by the participants

| **Capacity gaps and limitations** |
|---|
| Budget constraints |
| Shortage of personnel |
| Organisational structure |

The current study found that there are budget constraints in AWMU. Consequently, miscellaneous funds are used for funding environmental related expenses. To counter the budget limitations, recycling of waste such as tins and bottles was being used to generate funds.

*"Due to insufficient funds we have come up with a plan to generate funds in order to operationalise our plans. This deficiency led us to the concept of recycle with the aim to generate funds to advance our unfunded projects. The plan entailed purchasing big dustbins ... we would then place these dustbins in different positions and all the recyclable products would be dropped in these dustbins according to their categories; for example, tins would be separated from papers and be dropped in one dustbin."* (Participant C)

In terms of shortage of personnel and lack of organisational environmental structure, Participant F reported that the environmental structure in military unit lines allows only for an environmental officer and groundsmen (civilians employed in the SA DoDMV for base maintenance). The environmental officer appoints environmental representatives in the base. These appointed environmental representatives have certain limitations, such as lack of environmental training, and in most cases being committed to duties other than their environmental responsibilities. However, if the environmental structure was fully staffed and capacitated to do environmental tasks, it would be possible to fully implement integrated environmental management within the SA DoDMV.

The groundsmen under the BEMs are normally old and approaching pension. The DoD either does not replace them, or, in some cases, takes too long to replace them. This contributes to the deteriorating availability of personnel to assist with environmental duties in military unit lines. These capacity gaps and limitations may be considered hindrances to effective environmental management in the SANDF. In other words, even though the constitution and promulgated policies have set out a context for environmental management in military units, ineffective intervention resources and people will not achieve the intended outcome.

Shortage of human resources and budget constraints should be addressed urgently. Although the AWMU faces seemingly insurmountable challenges, the BEMs seem to be able to improve their environmental management performance. This means that the BEMs may be considered drivers of effective environmental management. The following section discusses the attributes of effective BEMs.

## 6.4 ATTRIBUTES OF AN EFFECTIVE BASE ENVIRONMENTAL MANAGER

Empirical evidence has demonstrated that environmental managers who are effective in the implementation of environmental practices have certain attributes (Jabbour, Santos & Nagano 2008). In line with this evidence, Magagula (2014:150) demonstrated that there are human-related skills that are necessary for the successful implementation of EMS within the SANDF.

These skills are the most critical resource upon which the success or failure to translate environmental policies, plans and programmes depend. Huang & Shih (2009) discovered that training regarding environmental issues capacitate employees with greater understanding, and enables their knowledge to be in line with the mission, vision, values and environmental policy of the organisation. Naturally, this leads to improved environmental commitment and performance. Frick, Kaiser & Wilson (2004) concluded that environmental managers with sufficient environmental training and knowledge would process information by using acquired knowledge. They know what they can do about environmental problems as they fully understand the problems and benefits of environmentally responsible actions.

On the question of attributes of effective BEM that contribute to successful EM in AWMU, the participants reported that there are certain attributes that the environmental manager must have. Table 6.2 shows the attributes of effective environmental managers contributing to successful environmental management.

Table 6.2: Attributes of an effective environmental manager

| **Attributes** |
|---|
| Knowledge |
| Co-operation and communication skills |
| Respect for military authority |
| Ability to recycle |
| Commitment, problem-solving skills, research capabilities |
| Ability to coordinate |
| Leadership qualities |

Participants mentioned that being knowledgeable in environmental issues is one of the factors that helps them to be effective environmental managers. They further believe that environmental knowledge improves their attitude towards environmental issues and their EM skills.

It is therefore imperative to state that a knowledgeable environmental manager can contribute positively towards effective environmental management. Moolman (2015) cites that environmental knowledge improves pro-environment behaviour. In addition, the participants revealed co-operation and communication skills as some of the attributes of effective environmental managers. These two attributes manifest mainly when there is interaction between the RFIMs and BEM's, OCs and the rest of the members of respective units. This interaction contributes to increased environmental awareness and effective management of environmental issues. The concept of respect for authority was also mentioned, along with co-operation and communication skills. The BEMs stated that it is necessary that they should subject themselves to military law and professionalism. It would allow EEMs to be commanded and directed by environmental policies, RFIMs and OCs in their execution of environmental duties. Empirical research by Yang (2007) shows that respect for authority contributes towards a healthy working environment. This implies that respect for authority plays a crucial role in ensuring that there is mutual understanding between RFIMs, OC and BEMs as they are collectively involved in military environmental management.

Participants reported that the ability to recycle is important in order to meet the demands of managing environmental issues under budgetary constraints. Through the process of recycling, funds are generated and used to fund environmental management activities.

Amongst the attributes of effective environmental management mentioned by the participants are commitment, problem-solving and research capabilities. Because there is no environmental structure in the units, BEMs resolve to commit themselves to work more than the official eight hours per day. Participants further stated that environmental training has provided them with suitable problem-solving and research skills needed to improve environmental management in military units. These skills are largely gained with the assistance of RFIMs through the support of OCs. BEMs stated that the ability to delegate environmental responsibility is important. It ensures that duties are allocated to different sections. Each section can be held responsible to perform certain delegated functions. This creates a common understanding and a synergy that results in effective environmental commitment from all sections in the unit.

The ability to provide leadership in environmental management in military unit lines is critical. Participants revealed that they are required to provide leadership in all environment-related activities in the unit. The need to draw up a standard operating procedure (SOP) and related registers. The SOP guides members on the course of action when dealing with environmental issues, while the registers are used to record all performed actions.

Moreover, they need to systematically assess and implement measures against risks associated with work environment and sustainability. It is thus important to note that though environmental duties are delegated to different sections in the unit, the BEMs remain accountable for providing leadership to ensure effective environmental management in military units. Hence, the attributes of environmental managers are drivers of effective environmental management that each BEMs should possess.

## 6.5 SUMMARY OF DRIVERS OF EFFECTIVE ENVIRONMENTAL MANAGEMENT

Environmental management challenges, such as an inadequate budget in the SA DoDMV mentioned by participants in this study and in empirical studies, impact the SANDF environmental effort negatively. Though this is the case, there are factors that were identified as drivers of effective environmental management in the AWMU in the WCR in spite of existing challenges. These factors are commitment, environmental awareness training, involvement of unit members, knowledge and skills, interaction with local environmental bodies and support of the unit OC and RFIMs.

### 6.5.1 Commitment

The personal commitment of individuals to environmental management is one of the strongest drivers of effective environmental management. The personal commitment of BEMs filters through the military unit. Commitment means that the BEMs put in extra effort and work longer hours to ensure that all their plans are implemented. The data collected shows that the majority of BEMs take courses in environmental management with institutions of higher learning and, in addition, continue to attend military environmental courses. This level of commitment and dedication promotes a stewardship that embodies effective military environmental management.

### 6.5.2 Environmental awareness training and involvement of unit members

The participants in this study perceive environmental awareness training as a driver of effective environmental management in military units. The BEMs, together with RFIMs, teach the members of the units how their decision regarding military action can affect and be affected by the environment. Environmental awareness training introduces unit members to ecological knowledge and puts them in a position to at least recognise any negative effect on the environment. In addition to increasing environmental awareness, unit members are also taught how to be stewards of the environment. This type of training is conducted continuously in the units. The main advantage is that they get all members in the unit to be involved and informed. Once trained, any unit member can be appointed as an environmental representative of his or her section.

The involvement of unit members in environmental awareness training builds in-depth environmental knowledge in all of them and allows them to contribute meaningfully towards unit environmental endeavours. In the AWMU environmental awareness training and involvement of unit members result in increased co-operation. This is important, more specifically considering that there is only one BEM per unit. Thus, environmental awareness training and involvement of unit members are perceived as drivers of effective environmental management in AWMU in the WCR by BEMs.

### 6.5.3 Environmental knowledge, skills and interaction with local environmental bodies

Knowledge of the actions that lead to adverse impact on the environment and the skills that ensure that military utilisation of facilities takes place in an environmentally sustainable manner are key. The participants in this study reported that they keep on improving their knowledge and skills, and use their knowledge to come up with ideas on how to improve the environmental management in their units. By being creative and innovative, BEMs are able to offset some of the disadvantages that come with the shortages in budget and environmentally skilled personnel. Creative interventions include interacting with local environmental bodies where sharing of knowledge and resources is done. Innovative ways of generating funds includes recycling of tins, funds of which are used for environmental management related activities. Hence, environmental knowledge, skills and interaction with local environmental bodies are the drivers of effective environmental management.

### 6.5.4 Support of the OCs and RFIMs

Support from the OCs and RFIMs can, in many instances, create tangible value for environmental management. The OCs have authority to guide the units and make decisions regarding the line function, while RFIMs have a vested mandate to oversee the environmental management performance of BEMs. Participants in the current study confirmed that the OCs provide them with resources and time to attend to environmental issues both within and outside military unit lines. Furthermore, they also provide platforms for environmental awareness training and assist BEMs with command and control issues of environmental management. On the other hand, RFIMs provide BEMs with support on the processes of environmental management through annual seminars and quarterly meetings. The support allows for the two-way communication where the importance of environmental management is embraced by OCs, RFIMs, BEMs and unit members at large. Thus, there is a bidirectional free flow of information. OC support motivates and enhances the awareness of unit members as sometimes the OCs highlight the importance of environmental management during communication periods in the unit. Hence, in AWMU the support of the OC and RFIMs is considered by participants as an important driver of effective environmental management.

# CHAPTER 7: CONCLUSION AND RECOMMENDATIONS

This chapter summarises the main findings of the research reported in this thesis by revisiting the objectives and highlighting the limitations and implication of the study. Recommendations for future research and closing remarks conclude the chapter.

## 7.1 REVISITING THE OBJECTIVES: SUMMARY OF THE MAIN FINDINGS

The study aimed to identify the drivers of effective military environmental management in the Western Cape Region. To achieve the goal of the research, five specific objectives were identified. In this section, these objectives are re-stated, and the main findings of each are presented to confirm their attainment.

### 7.1.1 Identification of the AWMU

The first obective of this study was to identify military units in the Western Cape Region that have won at least one of the annual military environmental awards in the five years preceding 2016. To achieve objective one, the researcher consulted with RFIMs and *South African Soldier* magazine to identify the units that won the environmental awards. BEMs in the identified units were later asked to confirm the name of the award and the year in which they won it and to give their perceptions concerning their context and environmental management. The process of identifying the military units used in the study is discussed in subsection 3.5.2. However, before soliciting the perceptions of the BEMs, a review of the appropriate literature was conducted as part of objective two.

### 7.1.2 Analysis and examination of the EIP

The obective of analysing and examining the the DoD EIP was to identify the mechanisms that the DoD uses in dealing with environmental management issues. To achieve this objective, the researcher carried out an analysis and examination of the first and the second editions of the EIP with the aim of identifying the mechanisms that the DoD is using to deal with environmental management issues. The analyses showed that there are mechanisms in place for the DoD to use in addressing environmental issues within military areas. In the implementation of these mechanisms, the DoD complies with national and provincial legislation, as well as international conventions, treaties, agreements and protocols. The mechanisms are implemented at various levels within the military structures.

The mechanisms used by the DoD include, firstly, external co-operative governance, which is a formal mechanism of liaison between the DoD and other departments. Secondly, internal co-operative governance, which are for formal mechanisms of co-operative governance and liaison between the different corporate divisions and functions within the department. Thirdly, the RSA-USA Bi-National Commission to observe the bi-lateral development of MIEM projects through the exchange of information and capacity. Fourthly, Inter-State Defence and Security Committee (ISDSC) Logistics Work Group, which explores areas for multilateral defence co-operation on logistics. Fifthly, mechanisms for monitoring implementation and environmental performance in the DoD. These monitoring mechanisms include ERF, REAFs, AEMR, DoD EAP, communication and ad hoc relations, as well as auditing and the guide to environmental compliance for OCs. Sixthly, mechanisms ensuring the implementation of effective integrated environmental management. The mechanisms that the DoD have identified as necessary for the implementation of effective integrated environmental management include various actions such as:

(i) developing ways and means to measure all cost related to the environmental management through liaison with the Auditor-General;
(ii) the DoD establishing structured and formally approved curricula of EE&T;
(iii) the DoD making provision for continual improvement through the revival of policy, procedures and guidelines;
(iv) developing audit policy and capacity to audit within the context of Defence, implement EMS, formally adopt ITAM and ensuring environmental considerations during the process of closing down military units;
(v) formalising management of environmental aviation safety with various stakeholders;
(vi) implementing guidelines and operational instructions on ECOps;
(vii) establishing structures to implement integrated environmental management at all levels, staff qualified and competent personnel in the structures, and make funding available to ensure compliance with relevant legislation;
(viii) ensuring liaison with environmental line function departments, the participation of DoD in FPA and ensuring that the establishment and continuation of DoD REAF exist in all regions; and
(ix) catering for environmental considerations in the acquisition and disposal of all systems and establishing formal co-operative governance relationship with the

Department of Customs regarding the control of foreign products entering the country when deployed military personnel returns from peace missions.

These mechanisms are some of the important mechanisms incoporated in the EIPs for the SA DoDMV. However, there is no certainty whether these mechanisms drive the effective environmental management in AWMU in WCR. Since the aim of this study is to identify the drivers of effective military environmental management, a semi-structured interview was developed to identify drivers of effective environmental management in AWMU in WCR.

### 7.1.3 Development of a semi-structured interview

To achieve objective three, initially, it was necessary to acquire up-to-date information on the process of developing semi-structured interviews. In addition to the EIPs, which provided the researcher with a window into what environmental managers are expected to do, the literature on developing the semi-structured interview scheduled was obtained. Following the literature reading, the development of the semi-structured interview schedule commenced. Review of relevant literature equipped the researcher with knowledge and information that was used for the drafting of the first edition of the semi-structured interview schedule and also helped with possible probing questions. The completed first draft of the semi-structured interview schedule was piloted at the South African Military Academy by four participants (three Military Geography honours students and the military academy environmental officer). The semi-structured interview schedule was subjected to further scrutiny by a focus group at the Military Academy consisting of Military Geography lecturers as well as senior researchers from other departments. The process mentioned above gauged the validity, straightforwardness, clarity and reliability of the semi-structured interview schedule and produced a dependable semi-structured interview schedule. Objective two provided the researcher with what questions to ask, while objective three equipped the researcher with how to formulate questions around the relevant and critical issues involved in the study.

### 7.1.4 Conducting of the semi-structured interviews with selected environmental managers

Semi-structured interviews conducted with seven BEMs and two RFIMs acquired biographical and service information of base environmental managers of the selected units and their perception regarding environmental policy, plans and programmes, monitoring mechanisms, capacity gaps and limitations and drivers of effective environmental management. The interviews were conducted face to face through English as the medium of communication and thread language of the DoD.

The researcher stayed mainly within the pre-developed categories and questions of the interview guide. However, when respondents mentioned unclear, new or interesting topics, the researcher asked for clarification. In that way, the necessary explanation of a question was provided by BEMs themselves. The researcher allowed participants ample time to respond to all the questions. At the end of each interview more time was provided for participants to reflect on the entire interview. Their closing remarks concluded the sessions. Participants were free to communicate and availed themselves for the follow-up questions. The output of this objective was qualitative data used to isolate the drivers of military environemntal management.

### 7.1.5 Drivers of effective environmental management in the WCR

To isolate the drivers of environmental management, the researcher used the results from the semi-structured interviews. The semi-structured interviews focused on environmental managers, environmental policies, plans and programmes, co-operative governance monitoring mechanisms and perceived drivers of effective environmental management. Though environmental managers had different military ranks, they underwent the same military environmental training and continued to meet at least four times a year. The participants all referred to the policies applicable to their respective rank and post levels. The policies provided a context for environmental management and are a resource that guides environmental managers. The findings revealed that environmental managers see monitoring mechanisms, plans, programmes and co-operative governance as interventions that are introduced to influence participants to improve their knowledge, commitment and behaviour regarding environmental managers. The results further show that various plans and structures are essential for environmental management. Participants in the study acknowledged the value added by monitoring mechanisms, intervention plans and guidebooks as vital for environmental management. Furthermore, the participants highlighted that despite the limitations and gaps induced by financial and human resource shortages they are still expected and often prepared to do their best to implement environmental policies and plans. Participants attributed their success in environmental management to factors relating to human resources.

These factors included the involvement of members on the base, REOs and the OC in environmental matters, commitment and loving their day-to-day environmental work, sufficient training, excellent research skills, delegation abilities, excellent communication skills and environmental knowledge and, lastly, drive and passion for environmental work.

The factors that environmental managers are attributing to their success to appear to be consisted and inseparable from what the BEMs described as drivers of environmental management.
This observation seems to be pertinent considering that these factors are involved in the actual implementation of the environmental policies, plans and programmes.

The results of the study thus show that, although the policy is perceived customarily as a driver of environmental management, in the actual implementation a specific set of drivers is required other than policy alone. The work of King, Lenox & Terlaak (2005) states that there is a disconnection between the adoption of policies and plans and the actual implementation. Thus, the contribution of this study is mainly towards identifying drivers that connect policies and actual implementation and results. The drivers of effective environmental management in award-winning military units in the Western Cape Region, in brief, are: commitment, the knowledge and skills of BEMs, the involvement of unit members, environmental training and awareness, support of the OCs and RFIMs, and interaction with local environmental bodies.

## 7.2 IMPLICATION OF THE STUDY

Based on the results of this study there is, therefore, the need for the WCR to prioritise its resources on strengthening the drivers mentioned in Section 6.5, more specifically in the units that are not effective in environmental management implementation. Since the study focused on the best performing units in environmental management, the results can be used to build the profile of an ideal environmental officer in the SA DoDMV. The findings of the study confirm that financial resources, environmental structure and external linkages are still challenging issues in the SA DoDMV for adequate implementation of environmental management. Policy-makers and senior management can use the findings as empirical evidence and address the limitations faced by BEMs at unit level. The study also shows that the SA DoDMV has struggled to implement by themselves some of the mechanisms it has adopted to use. Therefore, the results of this study highlight some of the deficiencies of the SA DoDMV concerning effective environmental management.

## 7.3 LIMITATIONS OF THE STUDY

This study was not without limitations. The major limitation of the study is that it focused only on the award-winning military units in the Western Cape Region. However, the researcher is of the view that the context of environmental management is similar for all of the military units in the Western Cape Region.

Only a limited number of individuals from particular environments participated in this study, and it is not easy to demonstrate that the findings and conclusions directly apply to other similar situations and military units. Consequently, the researcher provided a brief description of the context of where the collection of data took place, the researcher as a person, and participants, and about the researcher's relation with the participants as discussed in Section 4.1.

The study encountered limitations during the data collection phase as well. Data collection was time-consuming because it had to be done on fixed dates with participants. The distance between the researcher's office and home and sampled participants from different districts within the Western Cape Region also presented some challenges. To counter this, the researcher divided the participants into three sectors. Participants who resided in a particular sector were interviewed on the same day. The other limitation identified during interviews is that the participants tended to wander off the topic to what interests them instead of giving specific answers to the questions. The interview schedule was drafted prior to the interviews and prompting questions were used to steer the participants back to the matter at hand.

## 7.4 AVENUES FOR FURTHER RESEARCH

The research focused on the drivers of effective military environmental management in award-winning military units in the Western Cape Region. Thus, a more detailed investigation of drivers of effective environmental management in the entire DoDMV is encouraged. This could be a study that focuses on all units that have won the awards nationally. Then the results could be compared against the interviews of all personnel in units who had not won the awards. Furthermore, it is likely that specific drivers may have a more significant impact on the overall environmental performance than other drivers. Therefore, determining the drivers that contribute the most towards effective environmental management can assist the DoDMV in prioritising its limited resources to focus on those drivers that are more likely to produce the desired outcome. Besides the technical aspects of the issue of the environmental management system, future studies have to look at the softer issues that may be critical to the success of the EMS implementation. For example, Magagula (2014) developed a model for EMS. This model emphasised the importance and relevance of financial resources, competent staff and external linkages. Researchers studying environmental management in the DoD may consider focusing on those issues that seem to be a significant hindrance between the DoD and its environmental commitment.

## 7.5 CONCLUSION

This research adds value to the existing empirical research on the South African military environmental management system. Both practise and theory of environmental management can benefit from the results of this study. For practice, the results provide insight into the drivers of an effective environmental management system in military units in the SANDF. The theoretical contribution of the study can form the basis for more extensive research on monitoring environmental management using more data from more units nationally, and more militaries regionally. Among other things, the results of this research support the argument that there is a need to look at the internal environment, especially the skills of employees, top management support, training and education. The participants made it clear that the lack of adequate financial resources, lack of support structure and human resources are amongst the top factors that undermine their efforts towards effective military environmental management. The DoD has already identified most of its needs for effective environmental management since 2001 yet continued to fall short in the implementation. Furthermore, the study revealed that policy seems to exert little pressure as far as the implementation of the environmental management system is concerned. Though there is evidence of insurmountable challenges, commitment, knowledge and skills of BEMs, the involvement of unit members, support of the OCs and RFIMs, environmental awareness training and interaction with local environmental bodies play a significant role in driving effective environmental management in the award-winning military units in the Western Cape Region.

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**PERSONAL COMMUNICATION**

Laubscher L (lapmar@absamail.co.za) 2016. RE: Implementation of environmental management in the Western Cape Military Units. Email to L Ncubukezi (a_ncub@ma2.sun.ac.za) (2 December).

## APPENDIX A: FIRST DRAFT SEMI-STRUCTURED INTERVIEW SCHEDULE

My name is Major Lundi Ncubukezi. Thank you for allowing me to interview you.

During the interview, I would like to get your views on the following topics: policies, plans and programmes, co-operative governance and international relations (external and internal partners); monitoring mechanisms (Environmental Review Forum, Advisory Board, Annual Environmental Management Report, and auditing); the perceptions about what drives environmental management; capacity gaps or limitation and attributes of an environmental manager.

**BIOGRAPHICAL AND SERVICE INFORMATION OF ENVIRONMENTAL MANAGER**

Formation: _____

Unit: _____

Rank: _____

Time in employment of the Department of Defence: _____

Time in current post: _____

_____

Post responsibilities:_____

_____

Environmental experience: _____

_____

_____

Environmental courses completed: _____

| Main Questions | Probing/Additional questions |
|---|---|
| **1. What environmental award or awards did your unit win in the past five years?** | **Tell me more about this award or awards** |
| 2. What policies are informing your actions with regard to environmental management?<br><br>3. How important are these policies?<br><br>4. Are these policies easy to understand and follow? | Are these the only policies you use? |

| | |
|---|---|
| 5. Do you conduct or attend any environmental policy training? If yes, how helpful is this training?<br><br>6. Do they offer the necessary guidance?<br><br>7. How do these policies make it easier for you to achieve your environmental duties?<br><br>8. How do you ensure that environmental policies are adhered to or implemented?<br><br>9. Are there any hindrances in terms of applying the policies? | This is interesting. Anything more you would like to share regarding the policies? |
| **Plans and Programmes** | |
| 10. What plans do you have in place to deal with environmental issues in this unit?<br><br>11. Are these plans detailed enough? Are you capacitated to execute them?<br><br>12. Are these plans relevant to the challenges you are faced with on a daily basis?<br><br>13. What is your experience when it comes to the implementation of these plans?<br><br>14. How do you ensure the effective implementation of these plans?<br><br>15. Have you completed any projects in executing these plans? | How did you know about them?<br>What positive and negative aspects can you identify from these experiences?<br><br>This is interesting. Anything more you would like to share regarding the plans and programmes? |

| | |
|---|---|
| 16. What was its impact?<br><br>17. What would you do differently in the future?<br><br>18. Where the objectives met using these plans? | |
| **Co-operative Governance and partnership (internal, national and international)** | |
| 19. Do you have any interaction with other units within the DoD when it comes to environmental issues?<br><br>20. Concerning interaction within the DoD, please tell me about the support you get.<br><br>21. How does this interaction contribute towards your function of environmental management?<br><br>22. Who monitors your compliance regarding the plans and projects you have? | Projects?<br><br>Who supports these interactions?<br>How are they supported?<br>Is this support adequate?<br><br>What benefits do you get from these interactions? |
| 23. Do you have any interaction with other organisations outside of the DoD when it comes to environmental issues?<br><br>24. Do you have any environmental projects that you are participating in outside the DoD?<br><br>25. What are the constraints that hinder these interactions?<br><br>26. How do these interactions help you to achieve your environmental management goals? | Tell me more about these interactions. |
| | This is interesting. Anything more you |

| | |
|---|---|
| 27. Please tell me about any international partnership between you or your unit and any international organisation or military unity.<br><br>28. Any benefits from such a relationship/interaction?<br><br>29. How do these initiatives contribute towards environmental management in your unit? | would like to share regarding corporative governance? |
| **Monitoring Mechanisms** | |
| 30. Please tell me more about the Environmental Review Forum.<br><br>31. What do they do?<br><br>32. How is it assisting your unit?<br><br>33. How is this forum functioning? | |
| 34. Please tell me more about the Environmental Advisory Forums.<br><br>35. How is this forum helping you?<br><br>36. How is this forum functioning? | What expect advice? |
| 37. How does annual environmental management reporting help you? | |

| | |
|---|---|
| 38. How do you prepare it?<br><br>39. Is it a useful exercise?<br><br>40. How does it guide you?<br><br>41. How does it contribute to the overall goal of environmental management?<br><br>42. How frequently is it updated?<br><br>43. Do you think there is anything lacking about the process?<br><br>44. How practical is it to follow or do? | |
| 45. Please tell me about auditing.<br><br>46. How does the defence inspectorate conduct these audits?<br><br>47. How often are these conducted?<br><br>48. Do you think there is anything lacking from the process?<br><br>49. Do you get any feedback from the reports of the auditors?<br><br>50. How helpful is the report? | This is interesting. Anything more you would like to share regarding the monitoring mechanisms? |
| **General Perceptions** | |

| | |
|---|---|
| 51. In which areas of environmental management has your unit been successful?<br><br>52. What would you attribute your success to? | • good training<br>• education<br>• knowledgeable personnel<br>• support of management<br>• adequate budget |
| **Capacity Gaps and Limitations** | |
| 53. What are the capacity gaps and limitations you have experienced in your current post as an environmental manager? | Cost?<br>EE&T? |
| **Overall Drivers** | |
| 54. Name factors that are or were responsible for the overall success of your unit when it won the award.<br><br>55. What are the attributes of a good environmental manager? | This is interesting. Anything more you would like to share regarding environmental management? |

## APPENDIX B: PILOT INTERVIEW FEEDBACK QUESTIONNAIRE

PLEASE COMPLETE THE FOLLOWING QUESTIONNAIRE REGARDING THE INTERVIEW I CONDUCTED WITH YOU. THIS WILL HELP ME TO IMPROVE THE INTERVIEW SCHEDULE AND MY INTERVIEWING TECHNIQUE.

**Regarding the interview schedule**

(i) Was the interview too long/not long enough/ just right?

_____

(ii) Was the pace of the interview too fast/too slow/just right?

_____

(iii) Did you find it difficult to answer some of the questions?

_____

(iv) If you answered "yes" to Question 3, please indicate which question/s and why.

_____

_____

_____

(v) Can you identify any redundant questions?

_____

(vi) Can you identify any questions that should be added to the interview?

_____

_____

(vii) Any other comments you want to make regarding the interview schedule or interview process?

_____

_____

_____

**Regarding the interviewer**

(i) Did you feel comfortable answering the questions?

(ii) Please explain your response to Question 2.

(iii) Did the interviewer explain the purpose of the interview adequately?

(iv) Please explain your response to Question 3.

(v) Did the interviewer managed to make you feel comfortable during the interview?

(vi) If you answered "yes" to Question 5, please explain. Do the same if you answered "no".

(vii) Any other comments/suggestions you want to make regarding the way in which the interviewer facilitated the interview?

**Thank You for your time and effort**

# APPENDIX C: FINAL SEMI-STRUCTURED INTERVIEW SCHEDULE

**Introduction of interviewer**

My name is Major Lundi Ncubukezi. Thank you for allowing me to interview you.

During the interview, I would like to get your views on the following topics: policies, plans and programmes, co-operative governance and international relations (external and internal partners); monitoring mechanisms (Environmental Review Forum, Advisory Board, Annual Environmental Management Report, and auditing); the perceptions about what drives environmental management; capacity gaps or limitation and attributes of an environmental manager.

**BIOGRAPHICAL AND SERVICE INFORMATION OF ENVIRONMENTAL MANAGER**

Formation: _____

Unit: _____

Rank: _____

Time in employment of the Department of Defence: _____

Time in current post: _____

_____

Post responsibilities: _____

_____

Environmental experience: _____

_____

_____

Highest level of education completed: _____

_____

Functional courses completed: _____

_____

_____

_____

Environmental courses completed: _____

_____

_____

_____

| **Main Questions** | **Probing/Additional questions** | **Clarifying Questions** |
|---|---|---|
| **1. What environmental award or awards did your unit win in the past five years?** | **Tell me more about this award or awards.** | |
| **2. Policies** | | |
| 2.1 What policies are informing your actions with regard to environmental management?<br><br>2.2 How important are these policies?<br><br>2.3 Are these policies easy to understand and follow?<br><br>2.4 Do you conduct or attend any environmental policy training?<br><br>2.4.1 If yes, how helpful is this training?<br><br>2.4.2 Do they offer the necessary guidance?<br><br>2.4.3 If no, what training would you find useful?<br><br>2.5 How do these policies make it easier for you to achieve your environmental duties?<br><br>2.6 How do you ensure that environmental policies are carried out or implemented?<br><br>2.7 Are there any challenges in terms of applying the policies? | Are these the only policies you use?<br><br>This is interesting. Anything more you would like to share regarding the policies? | |

| **3. Plans and Programmes** | | |
|---|---|---|
| 3.1 What plans do you have in place to deal with environmental issues in this unit?<br><br>3.2 Are these plans detailed enough?<br><br>3.3 Are you equipped to execute them?<br><br>3.4 Are these plans relevant to the challenges you are faced with on a daily basis?<br><br>3.5 What is your experience when it comes to the implementation of these plans?<br><br>3.6 How do you ensure the effective implementation of these plans?<br><br>3.7 Have you completed any projects in executing these plans?<br><br>3.8 What was its impact?<br><br>3.9 What would you do differently in the future?<br><br>3.10 Were the objectives met using these plans? | How did you know about them?<br><br>What positive and negative aspects can you identify from these experiences?<br><br>This is interesting. Anything more you would like to share regarding the plans and programmes? | |

| **4. Co-operative Governance and Partnership (internal, national and international)** | | |
|---|---|---|
| 4.1 Do you have any interaction with other units within the DoD when it comes to environmental issues?<br><br>4.2 Concerning interaction within the DoD, please tell me about the support you get.<br><br>4.3 How does this interaction contribute towards your function of environmental management?<br><br>4.4 Who monitors your compliance regarding the plans and projects you have?<br><br>4.5 Do you have any interaction with other organisations outside of the DoD when it comes to environmental issues?<br><br>4.6 Do you have any environmental projects that you are participating in outside the DoD?<br><br>4.7 What are the challenges experienced with regard to these interaction?<br><br>4.8 How do these interactions help you to achieve your environmental management goals? | Projects?<br><br>Who supports these interactions?<br><br>How are they supported?<br>Is this support adequate?<br><br>What benefits do you get from these interactions?<br><br>Tell me more about these interactions. | Training?<br>Awareness?<br><br>Equipment?<br>Funds?<br>Personnel?<br><br>Individual?<br>Committee?<br><br>Other state department?<br>NGOs? |

| | | |
|---|---|---|
| 4.9 Please tell me about any international partnership between you or your unit and any international organisation or military unit.<br><br>4.10 Are there any benefits from such a relationship/ interaction?<br><br>4.11 How do these initiatives contribute towards environmental management in your unit? | This is interesting. Anything more you would like to share regarding the corporative governance? | Bi-National Commission between RSA-USA<br><br>Interstate Defence and Security Committee (SADC) |
| **5. Monitoring Mechanisms** | | |
| 5.1 Please tell me more about the Environmental Review Forum.<br><br>5.1.1 What do they do?<br><br>5.1.2 How is it assisting your unit?<br><br>5.1.3 How is this forum functioning? | | |

| | | |
|---|---|---|
| 5.2 Please tell me more about the Environmental Advisory Forums.<br><br>5.2.1 What do they do?<br><br>5.2.2 How is this forum helping you?<br><br>5.2.3 How is this forum functioning? | What expect advice? | |
| 5.3. Does annual environmental management reporting help you? If so, how? And if not, why not?<br><br>5.3.1 How do you prepare it?<br><br>5.3.2 Is it a useful exercise?<br><br>5.3.3 How does it guide you?<br><br>5.3.4 How does it contribute to the overall goal of environmental management?<br><br>5.3.5 How frequently is it updated?<br><br>5.3.6 Do you think there is anything lacking about the process?<br><br>5.3.7 How practical is it to follow or do? | | |

| | | |
|---|---|---|
| 5.4 Please tell me about auditing.<br><br>5.4.1 How does the defence inspectorate conduct this auditing?<br><br>5.4.2 How often are these conducted?<br><br>5.4.3 Do you think there is anything lacking from the process?<br><br>5.4.4 Do you get any feedback from the reports of the auditors?<br><br>5.4.5 How helpful is the report? | This is interesting. Anything more you would like to share regarding the monitoring mechanisms? | |
| **6. General Perceptions** | | |
| 6.1 In which areas of environmental management has your unit been successful?<br><br>6.2 What would you attribute your success to? | • good training<br>• education<br>• knowledgeable<br>• personnel<br>• support of management<br>• adequate budget | |
| **7. Capacity Gaps and Limitations** | | |
| 7.1 What are the capacity gaps and limitations you have experienced in your current post as an environmental manager? | Cost?<br>EE&T? | Is EE&T formalised?<br>Litigation?<br>Policy? |

| | | |
|---|---|---|
| | | Compliance? Internal relationships ? |
| **8. Overall Drivers** | | |
| 8.1 Name at least six factors that are or were responsible for the overall success of your unit when it won the environmental award.<br><br>8.2 What are the attributes of a good environmental manager? | This is interesting. Anything more you would like to share regarding environmental management? | |

# APPENDIX D: PERMISSION LETTER

RESTRICTED

hr division
Department:
Defence
REPUBLIC OF SOUTH AFRICA

MA/R/00002527 MC

Telephone: (022) 702-3146
Facsimile: (022) 702-3060
Enquiries: Maj L. Ncubukezi

Military Academy
Private Bag X2
Saldanha
7395

July 2016

Lt Col M. Laubscher

**REQUEST FOR A PERMISSION TO CONDUCT RESEARCH AS PART OF A STUDY ON INVESTIGATING FACTORS THAT CONTRIBUTE TO THE EFFECTIVE ENVIRONMENTAL MANAGEMENT OF MILITARY LANDS IN THE WESTERN CAPE REGION: 00002527 MC MAJOR L. NCUBUKEZI**

1. I at this moment request permission to research factors that contribute to the effective environmental management of military lands in the Western Cape region. The DoD and SANDF will benefit directly from this study. The study will include developing a semi-structured interview schedule and conducting interviews in various military units in the Western Cape Region.

2. In South Africa, national security is no longer viewed as a predominantly military and police problem. It has been broadened to incorporate political, economic, social and environmental matters. Consequently, the DoD is mandated by the Constitution, and more specifically, the National Environmental Management Act of 1998 (NEMA), to effective environmental management.

3. The DoD accepts the responsibility of stewardship for the environment under its control and within which it operates. It is also internally committed through the Environmental Implementation Plan for Defence, thus underlining the importance of the military environment and the effective management thereof.

RESTRICTED

**REQUEST FOR A PERMISSION TO CONDUCT RESEARCH AS PART OF A STUDY ON INVESTIGATING FACTORS THAT CONTRIBUTE TO THE EFFECTIVE ENVIRONMENTAL MANAGEMENT OF MILITARY LANDS IN THE WESTERN CAPE REGION: 00002527 MC MAJOR L. NCUBUKEZI**

4. The DoD needs to continuously assess the factors that contribute to the effective environmental management of the military lands under its control. Factors contributing to the sustainable environment are not rigid thus assessment and identification of these factors are imperative for the DoD to remain environmentally sound. Such a study will also help to assess the potential environmental impacts associated with critical policies, plans and programmes, as well as resources and how to prevent or remedy any ineffectiveness.

5. The study will commence once the authority has been granted.

6. The proposed study will have no financial implications for the SANDF.

7. Thank you for your consideration of this matter.

Yours faithfully

**(L. NCUBUKEZI)**
**ACADEMIC ASSISTANT MILITARY GEOGRAPHY: MAJ**

**APPROVAL BY DOD REGIONAL ENVIRONMENTAL MANAGER WESTERN CAPE**

Approved / ~~Not Approved~~

Good luck with your studies!

**(M. LAUBSCHER)**
**DOD REGIONAL ENVIRONMENTAL MANAGER WESTERN CAPE: LT COL**

# APPENDIX E: ETHICAL CLEARANCE

## ETHICS COMMITTEE APPLICATION FORM
## UNIVERSITY OF STELLENBOSCH
## SUBCOMMITTEE A
## 2016

**Application to the University of Stellenbosch SUBCOMMITTEE A for clearance of new research projects**

**This application must be typed or written in capitals**

**Name: Prof/Dr/Mr/Ms:** Maj L. Ncubukezi
**Position/Professional Status:** Academic Assistant in the department of Military Geography, Faculty of Military Science, Military Academy.

**Affiliation: Research Programme/Institution:**

MMil Candidate, Department of Military Geography, Faculty of Military Science, Military Academy.

Supervisor: Cdr H.A.P Smit
**Telephone:** **Code:** 022 no. 7023146
**Fax:** **Code:** 022 no. 7023060
**Email address:** a_ncub@ma2.sun.ac.za

**Title of research project: (*Do not use abbreviations*)**

Drivers of Environmental Management in the SANDF: A Case Study of Western Cape Units 2011–2015

**Where will the research be carried out?**

Within the units of the South African National Defence Force in the Western Cape Region

***All the following sections must be completed (Please tick all relevant boxes where applicable)***

1. **FUNDING OF THE RESEARCH: How will the research be funded?**

By researcher with institutional support from the South African Department of Defence.

2. **PURPOSE OF THE RESEARCH:**

To investigate and identify factors that contributes to the effective environmental management of the military lands in the Western Cape Region.

3. **AIMS AND OBJECTIVES OF THE RESEARCH:** ***(Please list objectives)***

Objective 1. To analyse the environmental management plan of the South African National Defence Force.

Objective 2. Assess the current levels of effectiveness in the implementation of the environmental management plan.

Objective 3. Identify factors that contribute to the efficiency/inefficiency of the environmental management of military lands.

4. **SUMMARY OF THE RESEARCH** ***(give a brief outline of the research plan – not more than 200 words)***

The study will commence by analysing the environmental implementation plan of the South African National Defence Force to establish the expected actions from the environmental managers and soldiers in general.

The next step will consist of drafting semi structured interview with the aim to assess the current factors that contribute to the effective implementation of the environmental management in the Western Cape military units. The planned semi structured interview schedule will be analysed for suitability of the intended purpose by the Geography Department and DOD regional environmental manager. Then the factors that contribute to the effective environmental management of the military lands will be identified.

## 5. NATURE AND REQUIREMENTS OF THE RESEARCH

**5.1 How should the research be characterized** ***(Please tick ALL appropriate boxes)***

| | |
|---|---|
| **5.1.1 Personal and social information collected directly from participants/subjects** | **X** |
| **5.1.2 Participants/subjects to undergo physical examination** | |
| **5.1.3 Participants/subjects to undergo psychometric testing** | |
| **5.1.4 Identifiable information to be collected about people from available records** | |
| **5.1.5 Anonymous information to be collected from available records** | **X** |
| **5.1.6 Literature, documents or archival material to be collected on individuals/groups** | **X** |

**5.2 Participant/Subject Information Sheet attached? (*For written and verbal consent)***

| | |
|---|---|
| **YES** | |
| **NO** | **X** |

**5.3 Informed Consent form attached?** ***(for written consent)***

| | |
|---|---|
| **YES** | |
| **NO** | **X** |

**5.3.1 If informed consent is not necessary, please state why:**

Subject Information Sheet and Informed Consent sheet, which will contain information for the participants, is not available yet and will be submitted shortly.

**NB: If a questionnaire, interview schedule or observation schedule/framework for ethnographic study will be used in the research, it must be attached. The application cannot be considered if these documents are not included.**

**5.4 Will you be using any of the above mentioned measurement instruments in the research?**

| | |
|---|---|
| **YES** | **X** |
| **NO** | |

The interview schedule will be designed as part of the study and be applied to selected members of the South African National Defence Force in the Western Cape. The interview schedule will be submitted for approval as soon as it has been developed, and prior to the commencement of the study.

## 6 PARTICIPANTS/SUBJECTS IN THE STUDY

**6.1 If humans are being studied, state where they are selected:**

Within the units of the South African National Defence Force in the Western Cape Region.

**Please mark the appropriate boxes:**

| **Participants/subjects will:** | **YES** | **NO** |
|---|---|---|
| **be asked to volunteer** | **X** | |
| **be selected** | **X** | |

**6.2.1 State how the participants/subjects will be selected, and/or who will be asked to volunteer:**

Participants will be selected using purposive sampling. If they do not wish to participate, another participant will be identified using snowball sampling. After all interviews are completed the results will be analysed in such a way that it will be impossible to identify participants.

**6.3 Are the participants/subjects subordinate to the person doing the recruiting?**

| | |
|---|---|
| **YES** | |
| **NO** | **X** |

**6.3.1 If yes, justify the selection of subordinate subjects:**

Not applicable

**6.4 Will control participants/subjects be used?**

| | |
|---|---|
| **YES** | |
| **NO** | **X** |

**6.4.1 If yes, explain how they will be selected:**

Not Applicable

**6.5 What records, if any, will be used, and how will they be selected?**

No personal records will be used, however, official military documentation will be used.

**6.6 What is the age range of the participants/subjects in the study?**

19 -60

**6.6.1 Was assent for guardians/consent for participants/subjects obtained?**

| | |
|---|---|
| **YES** | |
| **NO** | **X** |

***If YES, please attach the appropriate forms.***

**6.6.2 If NO, please state why:**

All participants are over the legal age of consent.

**6.7 Will participation or non-participation disadvantage the participants/subjects in any way?**

| | |
|---|---|
| YES | |
| NO | X |

**6.7.1 If yes, explain in what way:**

No, however, some participants may fear being disadvantaged if they refuse to participate. To counter this, the researcher and/or his research assistants will be on hand to explain the process and the anonymity of the semi-structured interview and to assure the subjects that participation is voluntary and that they will not be disadvantaged in any way for not participating.

**6.8 Will the research benefit the participants/subjects in any direct way?**

| | |
|---|---|
| YES | |
| NO | X |

**6.8.1 If yes, please explain in what way:**

However, the research will benefit the SANDF and the people of South African to the extent that it will draw attention to the factors that contribute to the effective environmental management of military lands in the Western Cape Region.

**7. PROCEDURES**

**7.1 Mark research procedure(s) that will be used:**

| | |
|---|---|
| Literature | X |
| Documentary | X |
| Personal records | |
| Interviews | X |
| Survey | X |
| Participant observation | |
| Other (please specify) _____ _____ | |

**7.2 How will the data be stored?**

The data will be stored securely in the office of the researcher.

**7.3 If an interview form/schedule; questionnaire or observation schedule/framework will be used, is it attached?**

| | |
|---|---|
| YES | |
| NO | X |

No, however as soon as the interview schedule is developed, and before it is used, it will be submitted for approval.

7.4 Risks of the procedure(s): Participants/subjects will/may suffer:

| | |
|---|---|
| No risk | X |
| Discomfort | |
| Pain | |
| Possible complications | |
| Persecution | |
| Stigmatisation | |
| Negative labeling | |
| Other (please specify) _____ _____ | |

7.4.1 If you have checked any of the above except "no risk", please provide details:

Not applicable

## 8. RESEARCH PERIOD

(a) When will the research commence:

July 2016

(b) Over what approximate time period will the research be conducted:

Project should be concluded by the end of 2018.

## 9. GENERAL

9.1 Has permission of relevant authority/ies been obtained?

| | |
|---|---|
| YES | X |
| NO | |

9.1.1 If yes, state name/s of authority/ies:

Informal consent has been secured. The process of obtaining formal consent from the South African Department of Defence has already commenced, but it is a rather lengthy process. The moment consent is secured; the necessary documentation will be made available to the Ethics committee.

9.2 Confidentiality: How will confidentiality be maintained to ensure that participants/subjects/patients/controls are not identifiable to persons not involved in the research?

All analyses will be done in such a way that it will be impossible to identify participants.

9.3 Results: To whom will results be made available, and how will the findings be reported to the research participants?

Results will be submitted to the supervisor in the form of a thesis. The results will also be made available to the Department of Defence. The findings will be made available to any participant that asks to be informed about it.

**9.4 There will be financial costs to:**

| | |
|---|---|
| **participant/subject** | |
| **institution** | |
| **Other (please specify)** Researcher | **X** |

**9.4.1 Explain any box marked YES:**

All costs incurred will be for the account of the researcher.

**9.5 Research proposal/protocol attached:**

| | |
|---|---|
| **YES** | **X** |
| **NO** | |

**9.6 Any other information which may be of value to the Committee should be provided here:**

None

---

**Date:** 04/07/2016 **Applicant`s signature**

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**Who will supervise the project?**

**Name: Commander H.A.P Smit**

**Programme/Institution/Department:** Department of Military Geography, Faculty of Military Science, Stellenbosch University.

**Date:** 21 July 2016 **Signature:**_____

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**Director/Head/Research Coordinator of Department/Institute in which study is conducted:**

**Name:**

**Date:** **Signature:**_____

## APPENDIX F: INFORMED CONSENT FORM

DRIVERS OF ENVIRONMENTAL MANAGEMENT IN THE SANDF: A CASE STUDY OF MILITARY UNITS IN THE WESTERN CAPE 2011–2015

I would like to invite you to participate in a research study examining drivers of military environmental management. This study will contribute to the knowledge related to effective military environmental management in military units in the Western Cape.

My name is Major Lundi Ncubukezi and data collected in this interview will help fulfil the requirements for a Master's degree in Military Geography at the Military Academy (Stellenbosch University). I am supervised by Cdr HAP Smit and Dr JDS van der Merwe.

**Participation required from you**

To allow me to ask you questions regarding environmental management in your unit, and to answer me truthfully.

**Your privacy**

Your participation in this study and your responses will be kept confidential. Any reference to you will be by pseudonym, including any direct quotes taken from your responses. This document and any notes or recordings that might personally identify you as a participant in this study will be kept in a locked place that only the researcher will have access to. Only the researcher and the research supervisors will know who has participated in this study. Three years after the completion of this research study all personally identifying information will be destroyed.

**Risks to you**

There are five possible acknowledged risks generally associated with participation in research studies: physical harm, psychological effects, social stigmatisation, economic and legal implications.

The researcher foresees minimal risk for those who choose to participate in this study. There are no foreseen physical risks associated with this study; other risks might include

the following: you might experience anxiety, discomfort, or negative emotions as a result of responding to the questions asked. If you experience a negative reaction, you may choose to skip the question, to withdraw from the study, or you may contact my supervisors, especially if your discomfort continues after the study. You might experience social, economic, or legal implications if you share your responses or your participation in this study with others. If you choose to participate in this study, you are encouraged to keep your participation in this study and your responses confidential. The researcher will maintain your confidentiality throughout the study, and will destroy the records of your participation three years after the study is completed.

**Benefits to you**

There are no foreseen direct benefits to you regarding participation in this study beyond the general knowledge that you are assisting in furthering the knowledge related to this research topic, and assisting the researcher in completing the Master's degree requirements. The results may help to improve environmental management in the DoD. There is no compensation associated with participation in this study.

By signing this document, you indicate that you consent to participate in the study. You also acknowledge that the researcher has explained your rights, the requirements of this study, and the potential risks involved in participating in this study. Lastly, that you understand your rights as a participant in this study.

You may withdraw from this study at any time. If you have any concerns regarding your participation in this research study, you may contact my study leaders Cdr HAP Smit and Dr JDS van der Merwe. You may ask for a copy of this document for your own records.

Signature: _____

Date: _____

Printed Name and Surname: _____

Phone No.: _____

Email Address: _____

*Thank you for your participation.*

Student

Major L Ncubukezi _____

Faculty of Military Science

Military Academy

School of Geospatial Studies and Information Systems

Department of Military Geography

Email Address: a_ncub@ma2.sun.ac.za

Supervisors

Cdr HAP Smit

Dr JDS van der Merwe

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